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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention]This invention relates to the electro photography photo conductor and image forming device which used an organic photoconductivity material and it.

[0002]

[Description of the Prior Art]In recent years, it is not only used for an electro photography photo conductor (it is also only hereafter called a "photo conductor"), but research and development in an organic photoconductivity material is done broadly, and the application to an electrostatic recording element, a sensor material, an organic electroluminescence (EL:Electroluminescent) element, etc. has started. Use of the electrophotographing system using an organic photoconductivity material, The printing plate material with which photograph art was used not only in the field of a copying machine but in the former, It spreads also to the field of a slide film, a microfilm, etc., and is applied also to the high speed printer which uses laser, LED (Light Emitting Diode), and CRT (Cathode Ray Tube) as a light source. Therefore, the demand to an organic photoconductivity material and the electro photography photo conductor using it is becoming broad at an altitude.

[0003]The inorganic photo conductor which has from the former a photosensitive layer which uses photoconductivity material of inorganic systems, such as selenium, a zinc oxide, and cadmium, as the main ingredients as an electro photography photo conductor is used widely. Although it has a certain amount of [this inorganic photo conductor] cardinal trait as a photo conductor, there are problems, like membrane formation is difficult, plasticity is bad, and a manufacturing cost is high. Generally the photoconductivity material of an inorganic system has strong toxicity, and there are big restrictions on manufacture and handling.

[0004]On the other hand, membrane formation nature is good, and the organic photoreceptor using the photoconductivity material of the organic system is excellent also in flexibility, and

also lightweight, Transparency is also good and is being gradually developed as the main force of an electro photography photo conductor from having an advantage, like the design of the photo conductor in which sensitivity is shown with a suitable sensitization method in a wide range wavelength band is easy, and there is. Although the conventional organic photoreceptor had a fault in sensitivity and endurance, it is remarkably improved with the functional discrete type electro photography photo conductor which made the charge generating function and the charge transport function share with a respectively separate substance. In such a functional discrete type photo conductor, it also has respectively the advantage that charge generating material and charge transport material have a wide material selection range, and the electro photography photo conductor which has the arbitrary characteristics can be produced comparatively easily.

[0005]Among these, as charge generating material which is a substance which takes charge of a charge generating function, The substance of varieties, such as a phthalocyanine pigment, squarylium coloring matter, an azo pigment, a perylene pigment, polycyclic quinone paints, cyanine dye, a squaric acid color, and pyrylium salt dye, is examined, and various substances with large electric charge developmental potency power with strong lightfastness are advocated.

[0006]On the other hand as charge transport material which is a substance which takes charge of a charge transport function, For example, the pyrazoline compound of the indication to JP,52-4188,B, JP,54-59143,A, The hydrazone compound of the indication to JP,54-150128,A, JP,55-42380,B, and JP,55-52063,A, The stilbene compound of the indication, etc. are known by the triphenylamine compound, JP,54-151955,A, and JP,58-198043,A of the indication to JP,58-32372,B and JP,2-190862,A. These days, the pyrene derivative and naphthalene derivative which have condensed multi-ring type hydrocarbon in the main mother nucleus, the terphenyl derivative of the indication to JP,7-48324,A, etc. are developed.

[0007]Stable [to 1 light and heat] to such charge transport material, 2) stable to the ozone generated by corona discharge, NO_x , nitric acid, etc., and 3 -- it is required that it has high charge transport capability, that compatibility with four organic solvents or a binder is high, that 5 manufacture should be easy and should be cheap, etc. Although the conventional charge transport material satisfies said a part of demand, it has not come [however,] to be satisfied with a high level of all.

[0008]Having high charge transport capability especially is called for strongly. That is, when the charge transport layer which made it distribute with binder resin and constituted charge transport material turns into a surface layer of a photo conductor and it carries and uses for a copying machine or a laser beam printer, it is obliged to shave off the part by function members, such as a cleaning blade and a charged roller. For high-durability-izing of a copying machine or a laser beam printer, the photo conductor which has a strong surface layer to those

function members is called for. Then, if content of binder resin in a charge transport layer is made high in order to strengthen a surface layer and to raise endurance, an optical response will fall. It is because the transport capacity of charge transport material itself is small as for this. If an optical response is bad, the surface potential of a photo conductor will use it repeatedly in the state where it is not fully decreasing, the electrical change accompanying a rest potential rise will increase, and it will be accompanied by evils, such as causing deterioration of imaging quality at an early stage.

[0009]These days, the miniaturization of electrophotography devices, such as a digital copier and a printer, and improvement in the speed progress, high sensitivity-ization corresponding to improvement in the speed is also required as the photo conductor characteristic, and charge transport capability increasingly high as charge transport material is called for.

[0010]As charge transport material which fills such a demand, the enamine compounds of an indication can be mentioned to JP,2-51162,A and JP,10-69107,A. These enamine compounds have high charge transport capability, and the photo conductor using these has become what has good endurance by high sensitivity.

[0011]As the characteristic of a photo conductor, also when it uses under low temperature environment, it is called for that sensitivity does not fall, but the charge transport material realized to such the characteristic is not obtained.

[0012]

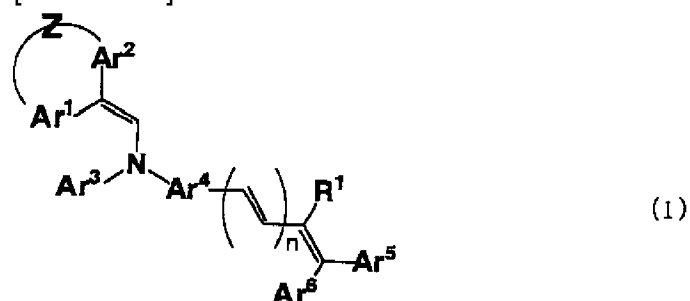
[Problem(s) to be Solved by the Invention]Electrification potential is high sensitivity highly and the purpose of this invention has sufficient optical response in the bottom of low temperature environment, and a high speed process, And it is excelling in endurance and providing an electro photography photo conductor, a sensor material, an EL element, an electrostatic recording element, etc. with the electro photography photo conductor and image forming device using the enamine compounds and it which are an usable organic photoconductivity material.

[0013]

[Means for Solving the Problem]This invention is enamine compounds shown with a following general formula (1).

[0014]

[Formula 4]



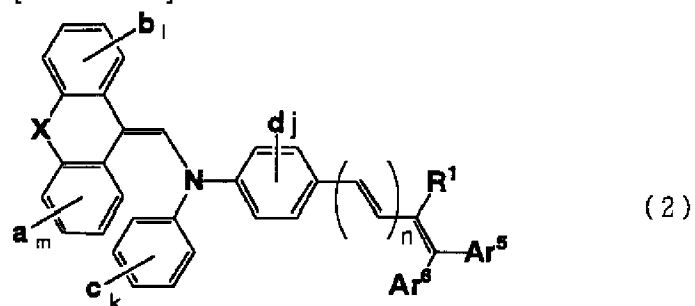
[0015](Ar¹ and Ar² show among a formula a heterocycle group which may also contain an aryl group which may also contain a substituent respectively, or a substituent.) Z shows an atomic group required in order to form a ring with Ar¹ and Ar². Ar³ and Ar⁴ show an alkyl group which may also contain an aryl group which may also contain a substituent respectively, a heterocycle group which may also contain a substituent, an aralkyl group which may also contain a substituent, or a substituent. Ar⁵ and Ar⁶ show an alkyl group which may also contain respectively a hydrogen atom, an aryl group which may also contain a substituent, a heterocycle group which may also contain a substituent, an aralkyl group which may also contain a substituent, or a substituent. Both Ar⁵ and Ar⁶ may form a ring. R¹ shows an alkyl group which may also contain a hydrogen atom or a substituent. n shows an integer of 0-2.

[0016]If this invention is followed, enamine compounds which are the photoconductivity material of a high organic system of charge mobility can be obtained by low cost by having the structure shown by said general formula (1) compared with photoconductivity material of an inorganic system. Thus, if it is used for an electro photography photo conductor, a sensor material, an EL element, an electrostatic recording element, etc. by using enamine compounds with high mobility as an organic photoconductivity material, a device which was excellent in a response can be provided.

[0017]Enamine compounds in which this invention is shown by said general formula (1) are shown by following general formula (2).

[0018]

[Formula 5]



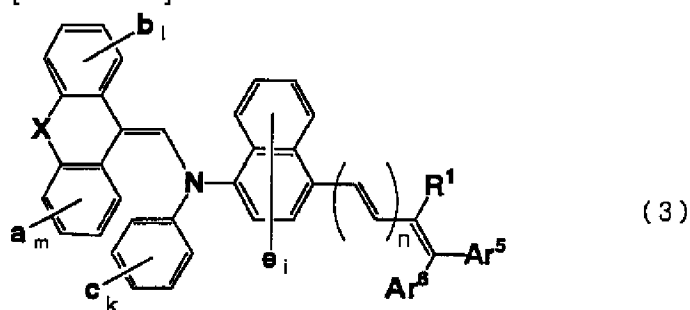
[0019]the alkyl group of the carbon numbers 1-5 in which a, b, c, and d may also contain an each substituent among a formula. The dialkylamino group, halogen atom, or hydrogen atom containing the alkoxy group of the carbon numbers 1-3 which may also contain a substituent, and the alkyl group of the carbon numbers 1-3 which may also contain a substituent is shown, j, l, and m show the integer of 1-4, and k shows the integer of 1-5 respectively. However, when j, k, l, and m are two or more, corresponding a, b, c, and d may be respectively the same, or may differ from each other, and may form a ring mutually. The alkyl chain which is an atomic

group required in order that X may form a ring, and may also contain a substituent, The unsaturation alkyl chain which may also contain a substituent, the alkyl chain containing a hetero atom, O, S, Se, N-R², Si-R³₂, or SO₂ is shown, R² shows the aryl group which may also contain the alkyl group or substituent of the carbon numbers 1-5 which may also contain a substituent, R³ shows the aryl group or halogen atom which may also contain the alkyl group of the carbon numbers 1-5 which may also contain a substituent, the alkoxy group of the carbon numbers 1-5 which may also contain a substituent, and a substituent. Ar⁵, Ar⁶, R¹, and n are synonymous with what was defined in said general formula (1).

[0020]Enamine compounds in which this invention is shown by said general formula (1) are shown by following general formula (3).

[0021]

[Formula 6]



[0022](e shows among a formula the dialkylamino group, halogen atom, or hydrogen atom containing the alkyl group of the carbon numbers 1-5 which may also contain a substituent, the alkoxy group of the carbon numbers 1-3 which may also contain a substituent, and the alkyl group of the carbon numbers 1-3 which may also contain a substituent, and i shows the integer of 1-6.) However, when i is two or more, e may be respectively the same, or may differ and may form a ring mutually. Ar⁵, Ar⁶, R¹, n, a, b, c, k, l, m, and X are synonymous with what was defined in said general formula (1) and (2).

[0023]If this invention is followed, the enamine compounds which are the photoconductivity material of the high organic system of especially charge mobility can be obtained by low cost compared with the photoconductivity material of an inorganic system by having the structure shown by said general formula (2) or (3). Thus, if it is used for an electro photography photo conductor, a sensor material, an EL element, an electrostatic recording element, etc. by using enamine compounds with high mobility as an organic photoconductivity material, the device which was excellent in the response can be provided.

[0024]This invention is an electro photography photo conductor containing said enamine compounds as charge transport material in a photosensitive layer provided on a conductive substrate.

[0025]If this invention is followed, an electro photography photo conductor which has sufficient optical response also in the bottom of low temperature environment and a high speed process by high sensitivity can be obtained by making it contain in a photosensitive layer by using as charge transport material high enamine compounds of charge mobility shown by said general formula (1) - (3). By using enamine compounds with such high mobility, binder resin can be added by a ratio higher than a case where publicly known charge transport material is used conventionally, print durability can be improved and an electro photography photo conductor with high endurance can be obtained.

[0026]This invention is characterized by said photosensitive layer being a laminated structure which has a charge generating layer containing charge generating material, and a charge transport layer containing said charge transport material at least.

[0027]If this invention is followed, an electro photography photo conductor of a lamination type which was excellent in endurance by high sensitivity can be provided by making a charge transport layer contain high enamine compounds of charge mobility shown by said general formula (1) - (3).

[0028]This invention provided an interlayer between said conductive substrate and a photosensitive layer.

[0029]If this invention is followed, while giving a protection feature of a photosensitive layer by providing an interlayer between a conductive substrate and a photosensitive layer, the adhesive property of a photosensitive layer and a conductive substrate and the spreading nature of a photosensitive layer can be improved. Pouring of an electric charge from a conductive substrate to a photosensitive layer and substrate reflection of a laser beam can prevent generating etc. of an interference fringe considered to be the main cause.

[0030]This invention is an image forming device provided with said electro photography photo conductor.

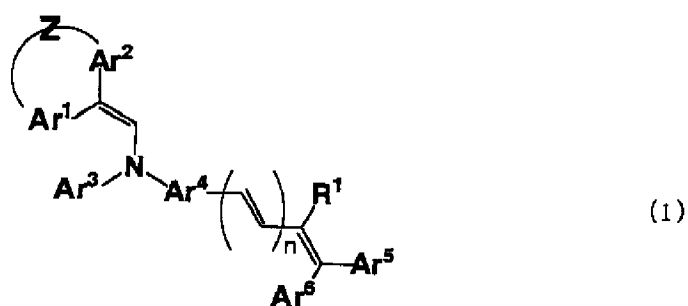
[0031]If this invention is followed, by having an electro photography photo conductor which contains the above enamine compounds as charge transport material, it excels in endurance by high sensitivity, and also when it uses by the bottom of low temperature environment, and a high speed process, an image forming device with which the electrical property does not fall can be provided.

[0032]

[Embodiment of the Invention]The enamine compounds of this invention are shown by the following general formula (1).

[0033]

[Formula 7]



[0034]In said general formula (1), Ar¹ and Ar² show a heterocycle group which may also contain an aryl group which may also contain a substituent respectively, or a substituent. As an example, heterocycle groups, such as aryl groups, such as phenyl, tolyl, anisyl, naphthyl, and biphenyl, and a benzo furil, benzo thiophenyl, N-methyl indolyl, and N-ethyl carbazolyl, are mentioned.

[0035]In said general formula (1), Z shows an atomic group required in order to form a ring with Ar¹ and Ar². As an example, alkyl chains, such as a methylene chain, an ethylene chain, and a dimethyl methylene chain, Hetero atoms etc. which have substituents, such as unsaturation alkyl chains, such as a vinylene chain and a propylene chain, and an oxygen atom, a sulfur atom, a selenium atom, and an alkyl group, such as a nitrogen atom and silicon, can be mentioned.

[0036]In said general formula (1), Ar³ and Ar⁴ show an alkyl group which may also contain an aryl group which may also contain a substituent respectively, a heterocycle group which may also contain a substituent, an aralkyl group which may also contain a substituent, or a substituent. As an example, aryl groups, such as phenyl, tolyl, anisyl, naphthyl, pyrenyl, and biphenyl, A benzo furil, benzo thiophenyl, N-methyl indolyl, benzothiazolyl, Alkyl groups, such as aralkyl groups, such as heterocycle groups, such as benzoxazolyl and N-ethyl carbazolyl, benzyl, p-methoxybenzyl, and 1-naphthyl methyl, and n-propyl, isopropyl, t-butyl, cyclohexyl, and cyclopentyl, are mentioned.

[0037]In said general formula (1), Ar⁵ and Ar⁶ show an alkyl group which may also contain respectively a hydrogen atom, an aryl group which may also contain a substituent, a heterocycle group which may also contain a substituent, an aralkyl group which may also contain a substituent, or a substituent. As an example, aryl groups, such as phenyl, tolyl, anisyl, naphthyl, pyrenyl, and biphenyl, A benzo furil, benzo thiophenyl, 1-methylthio phenyl, N-methyl indolyl, Heterocycle groups, such as benzothiazolyl, benzoxazolyl, and N-ethyl carbazolyl, Alkyl groups, such as aralkyl groups, such as benzyl, p-methoxybenzyl, and 1-naphthyl methyl, and n-propyl, isopropyl, t-butyl, cyclohexyl, and cyclopentyl, are mentioned. Both Ar⁵ and Ar⁶ may form a ring. An atomic group may be passed in order to form the ring. As an example of an atomic group, alkyl chains, such as a methylene chain, an ethylene chain,

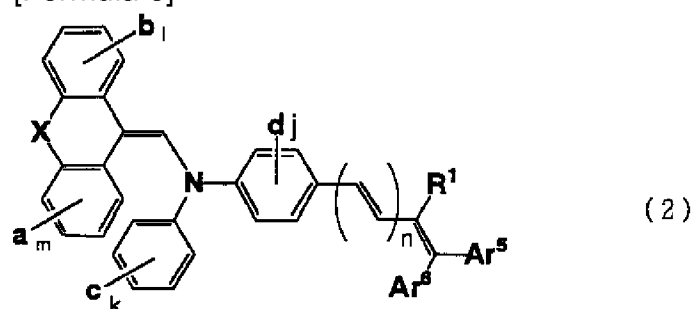
and a dimethyl methylene chain, Hetero atoms etc. which have substituents, such as unsaturation alkyl chains, such as a vinylene chain and a propylene chain, and an oxygen atom, a sulfur atom, a selenium atom, and an alkyl group, such as a nitrogen atom and silicon, can be mentioned.

[0038]In said general formula (1), R^1 shows an alkyl group which may also contain a hydrogen atom or a substituent. As an example, alkyl groups, such as methyl, ethyl, n-propyl, isopropyl, and trifluoromethyl, are mentioned.

[0039]In said general formula (1), n shows an integer of 0-2. Specifically as a compound contained in enamine compounds shown by said general formula (1), enamine compounds shown with the following general formula (2) and (3) can be mentioned.

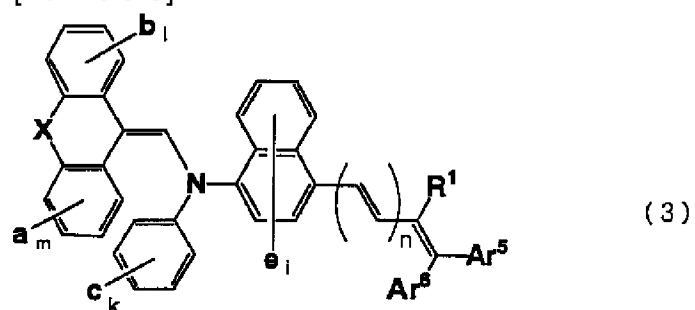
[0040]

[Formula 8]



[0041]

[Formula 9]



[0042]In said general formula (2), a, b, c, and d, The alkyl group of the carbon numbers 1-5 which may also contain a substituent respectively, the alkoxy group of the carbon numbers 1-3 which may also contain a substituent, The dialkylamino group, halogen atom, or hydrogen atom containing the alkyl group of the carbon numbers 1-3 which may also contain a substituent is shown, j, l, and m show the integer of 1-4, and k shows the integer of 1-5 respectively. However, when j, k, l, and m are two or more, corresponding a, b, c, and d may be respectively the same, or may differ from each other, and may form a ring mutually.

[0043]It is an atomic group required in order that X may form a ring in said general formula (2),

An alkyl chain which may also contain a substituent, an unsaturation alkyl chain which may also contain a substituent, an alkyl chain containing a hetero atom, an oxygen atom, a sulfur atom, a selenium atom, $N-R^2$, $Si-R^3_2$, or SO_2 is shown. R^2 shows here an aryl group which may also contain an alkyl group or a substituent of the carbon numbers 1-5 which may also contain a substituent, R^3 shows an aryl group or a halogen atom which may also contain an alkyl group of the carbon numbers 1-5 which may also contain a substituent, an alkoxy group of the carbon numbers 1-5 which may also contain a substituent, and a substituent.

[0044]In said general formula (2), Ar^5 , Ar^6 , R^1 , and n are synonymous with what was defined in said general formula (1).

[0045]An alkyl group of the carbon numbers 1-5 in which e may also contain a substituent in said general formula (3), A dialkylamino group, a halogen atom, or a hydrogen atom containing an alkoxy group of the carbon numbers 1-3 which may also contain a substituent, and an alkyl group of the carbon numbers 1-3 which may also contain a substituent is shown, and i shows an integer of 1-6. However, when i is two or more, e may be respectively the same, or may differ and may form a ring mutually.

[0046]In said general formula (3), Ar^5 , Ar^6 , R^1 , n , a , b , c , k , l , m , and X are synonymous with what was defined in said general formula (1) and (2).


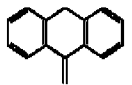



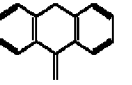



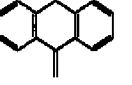


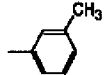
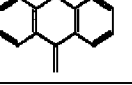


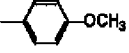
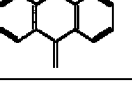


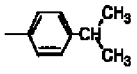
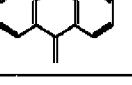


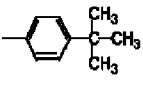
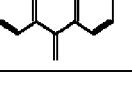


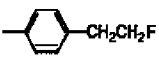
[0047]In said general formula (2) and (3), as an example of a , b , c , d , and e , In an alkyl group of the carbon numbers 1-5 which may also contain a substituent. Methyl, ethyl, n -propyl, isopropyl, trifluoromethyl, By an alkoxy group of the carbon numbers 1-3, 1,1,1-trifluoroethyl, fluoromethyl, 1-methoxy ethyl, etc. At a dialkylamino group containing alkyl groups of the carbon numbers 1-3, such as methoxy and ethoxy ** n -propoxy and isopropoxy, a fluorine atom, a chlorine atom, a bromine atom, etc. are mentioned with halogen atoms, such as dimethylamino, diethylamino, and diisopropylamino.

[0048]In said general formula (2) and (3), as an example of X , Alkyl chains, such as a methylene chain, an ethylene chain, a propylene chain, and a dimethyl methylene chain, An alkyl chain containing hetero atoms, such as unsaturation alkyl chains, such as a vinylene chain and a propylene chain, and a oxy methylene chain, Hetero atoms, such as silicon which has a nitrogen atom which has SO_2 and an oxygen atom, a sulfur atom, a selenium atom, a methyl group, an ethyl group, or a phenyl group and a methyl group, a methoxy group, an ethoxy basis, a phenyl group, or a chlorine atom, are mentioned.

[0049]Enamine compounds shown by said general formula (2) and (3) are compounds contained in enamine compounds shown by said general formula (1) as mentioned above. If these enamine compounds are mentioned concretely, a compound shown in Tables 1-59 can be illustrated, but enamine compounds of this invention are not limited by these.


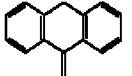



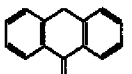


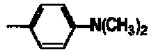
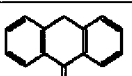



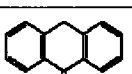


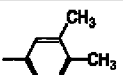
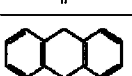


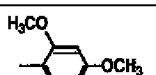
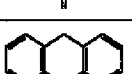


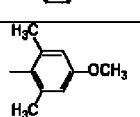
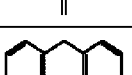



[0050]

[Table 1]

例示化合物No		Ar^3	Ar^4	n	R^1	Ar^5	Ar^6
1				0	H	H	
2				0	H	H	
3				0	H	H	
4				0	H	H	
5				0	H	H	
6				0	H	H	
7				0	H	H	


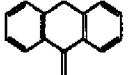



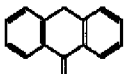



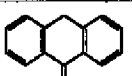


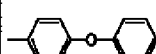
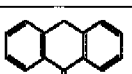



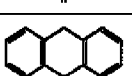


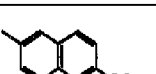
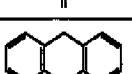



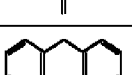



[0051]

[Table 2]

例示化合物No		Ar^3	Ar^4	n	R^1	Ar^5	Ar^6
8				0	H	H	
9				0	H	H	
10				0	H	H	
11				0	H	H	
12				0	H	H	
13				0	H	H	
14				0	H	H	

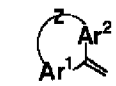
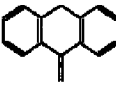


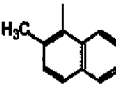
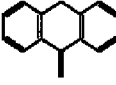


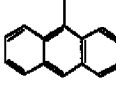
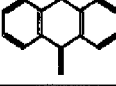



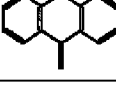


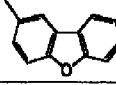
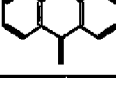


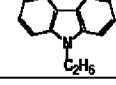
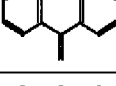


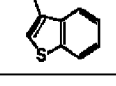
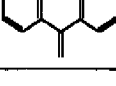


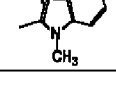
[0052]

[Table 3]

例示化合物No		Ar^3	Ar^4	n	R^1	Ar^5	Ar^6
15				0	H	H	
16				0	H	H	
17				0	H	H	
18				0	H	H	
19				0	H	H	
20				0	H	H	
21				0	H	H	


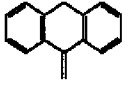



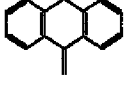



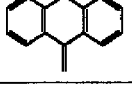



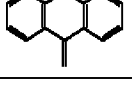



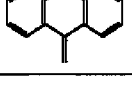



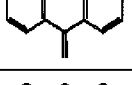



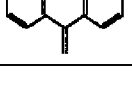



[0053]

[Table 4]

例示化合物No		Ar^3	Ar^4	n	R^1	Ar^5	Ar^6
22				0	H	H	
23				0	H	H	
24				0	H	H	
25				0	H	H	
26				0	H	H	
27				0	H	H	
28				0	H	H	


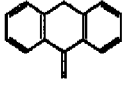


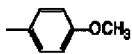
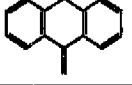




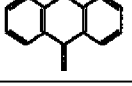



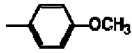
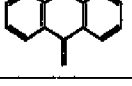




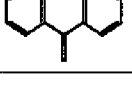




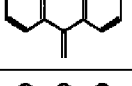




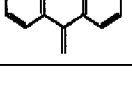




[0054]

[Table 5]

例示化合物No		Ar^3	Ar^4	n	R^1	Ar^5	Ar^6
29				0	H	H	
30				0	H	H	
31				0	H	H	
32				0	H	H	
33				0	H	$-CH_3$	
34				0	H	$-CH_3$	
35				0	H	$-CH(CH_3)_2$	

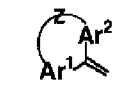
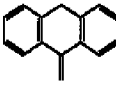


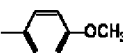
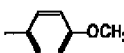
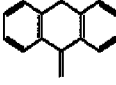



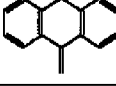


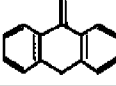
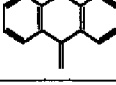



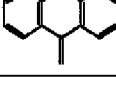


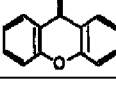
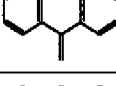


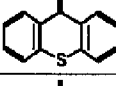
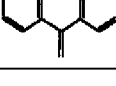


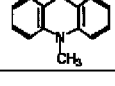
[0055]

[Table 6]

例示化合物No		Ar^3	Ar^4	n	R^1	Ar^5	Ar^6
36				0	H	$-CH(CH_3)_2$	
37				0	H		
38				0	H		
39				0	H		
40				0	H		
41				0	H		
42				0	H		

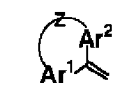
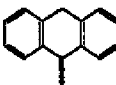



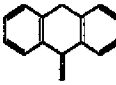



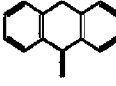




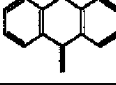



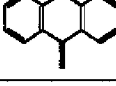




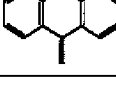




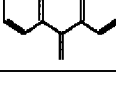



[0056]

[Table 7]

例示化合物No		Ar^3	Ar^4	n	R^1	Ar^5	Ar^6
43				0	H		
44				0	H		
45				0	H		
46				0	H		
47				0	H		
48				0	H		
49				0	H		


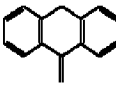
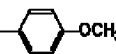


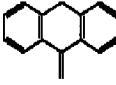
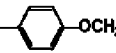

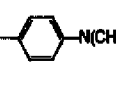
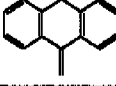
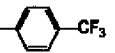


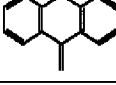
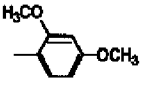


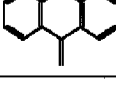
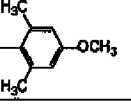


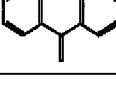



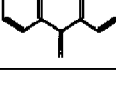
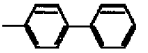


[0057]

[Table 8]

例示化合物No		Ar^3	Ar^4	n	R^1	Ar^5	Ar^6
50				0	$-CH_3$	H	
51				0	$-CH_3$	H	
52				0	$-CH_3$		
53				1	H	H	
54				1	H		
55				2	H		
56				0	H	H	

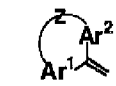
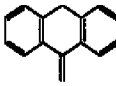
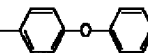

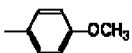
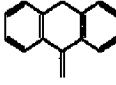


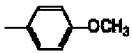
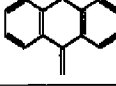
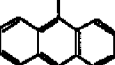

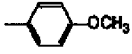
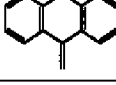


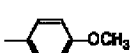
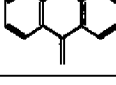
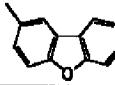

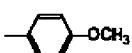
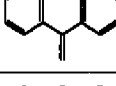


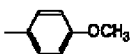
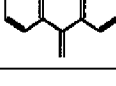


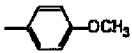
[0058]

[Table 9]

例示化合物No		Ar^3	Ar^4	n	R^1	Ar^5	Ar^6
57				0	H	H	
58				0	H	H	
59				0	H	H	
60				0	H	H	
61				0	H	H	
62				0	H	H	
63				0	H	H	

[0059]

[Table 10]

例示化合物No		Ar^3	Ar^4	n	R^1	Ar^5	Ar^6
64				0	H	H	
65				0	H	H	
66				0	H	H	
67				0	H	H	
68				0	H	H	
69				0	H	H	
70				0	H	H	

[0060]

[Table 11]

例示化合物No		Ar^3	Ar^4	n	R^1	Ar^5	Ar^6
71				0	H	H	
72				0	H	H	
73				0	H	H	
74				0	H	H	
75				0	H	H	
76				0	H	H	
77				0	H	H	


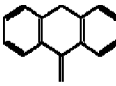
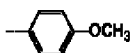


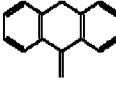
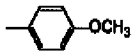


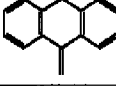
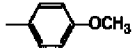


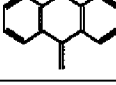
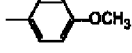


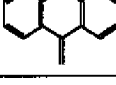
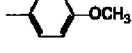

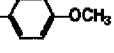
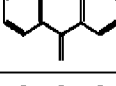
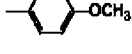



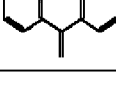
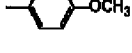



[0061]

[Table 12]

例示化合物No		Ar^3	Ar^4	n	R^1	Ar^5	Ar^6
78				0	H	H	
79				0	H	H	
80				0	H	H	
81				0	H	H	
82				0	H	H	
83				0	H	H	
84				0	H	H	


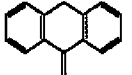
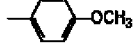



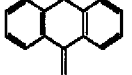


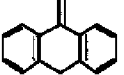
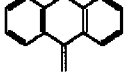
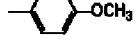

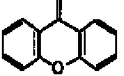
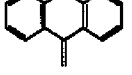
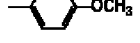

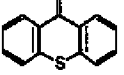
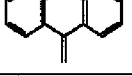
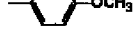

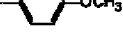
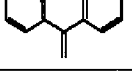




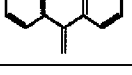




[0062]

[Table 13]

例示化合物No		Ar^3	Ar^4	n	R^1	Ar^5	Ar^6
85				0	H	H	
86				0	H	H	
87				0	H	H	
88				0	H	H	
89				0	H	$-CH_3$	
90				0	H		
91				0	H		


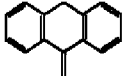
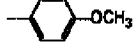



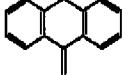
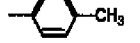

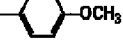
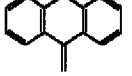
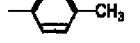

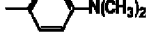
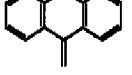
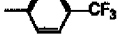

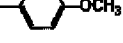
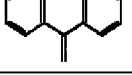
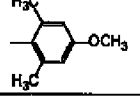

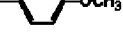
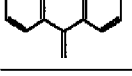
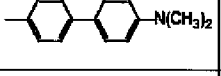

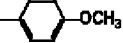
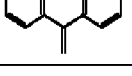


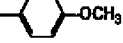
[0063]

[Table 14]

例示化合物No		Ar ³	Ar ⁴	n	R ¹	Ar ⁵	Ar ⁶
92				0	H		
93				0	H		
94				0	H		
95				0	H		
96				0	-CH ₃	H	
97				0	-CH ₃		
98				1	H		


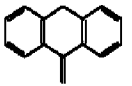
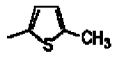

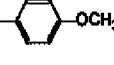
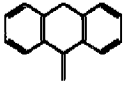
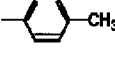

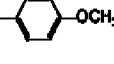
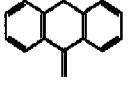
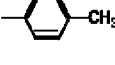
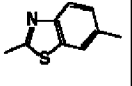
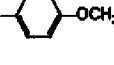
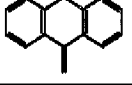
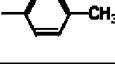
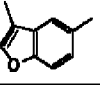
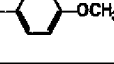
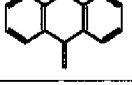
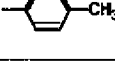
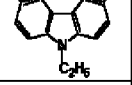
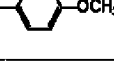
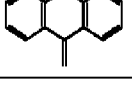
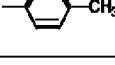
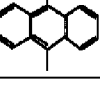
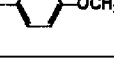
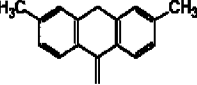


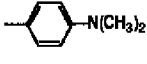
[0064]

[Table 15]

例示化合物No		Ar ³	Ar ⁴	n	R ¹	Ar ⁵	Ar ⁶
99				2	H		
100				0	H	H	
101				0	H	H	
102				0	H	H	
103				0	H	H	
104				0	H	H	
105				0	H	H	


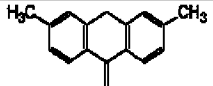


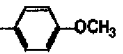
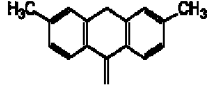
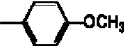


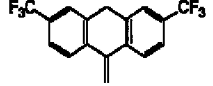
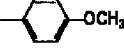

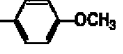
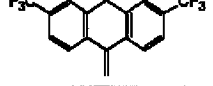
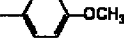

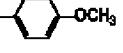
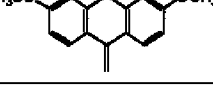
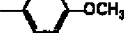

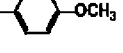
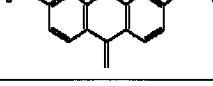
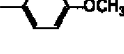

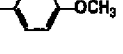
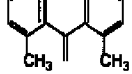
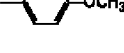


[0065]

[Table 16]

例示化合物No		Ar^3	Ar^4	n	R^1	Ar^5	Ar^6
106				0	H	H	
107				0	H	H	
108				0	H	H	
109				0	H	H	
110				0	H	H	
111				0	H	H	
112				0	H	H	

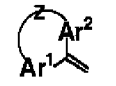
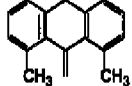
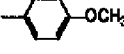

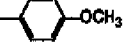
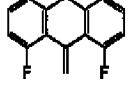
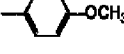

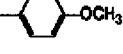
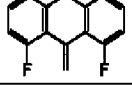
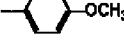

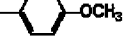
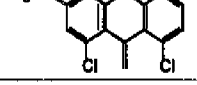
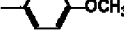

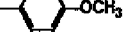
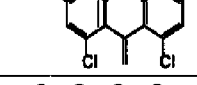
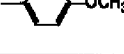

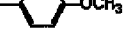
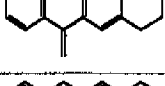



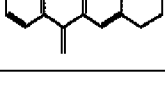
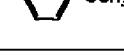

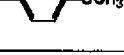
[0066]

[Table 17]

例示化合物No		Ar^3	Ar^4	n	R^1	Ar^5	Ar^6
113				0	H	H	
114				0	H	H	
115				0	H	H	
116				0	H	H	
117				0	H	H	
118				0	H	H	
119				0	H	H	


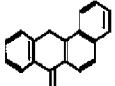



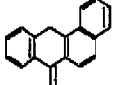



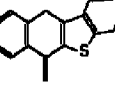



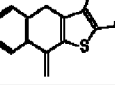



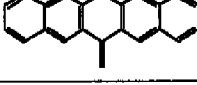
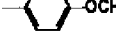


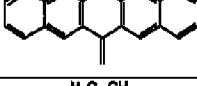
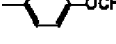


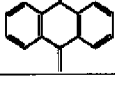



[0067]

[Table 18]

例示化合物No		Ar^3	Ar^4	n	R^1	Ar^5	Ar^6
120				0	H	H	
121				0	H	H	
122				0	H	H	
123				0	H	H	
124				0	H	H	
125				0	H	H	
126				0	H	H	

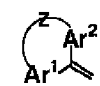
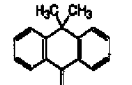


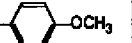
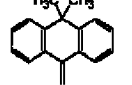

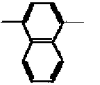
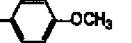
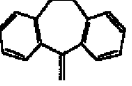


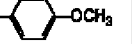
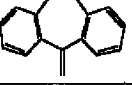

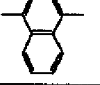
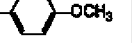
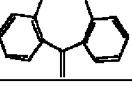


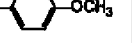
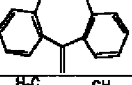

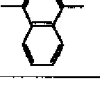

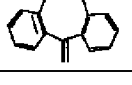



[0068]

[Table 19]

例示化合物No		Ar^3	Ar^4	n	R^1	Ar^5	Ar^6
127				0	H	H	
128				0	H	H	
129				0	H	H	
130				0	H	H	
131				0	H	H	
132				0	H	H	
133				0	H	H	


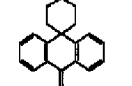


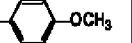
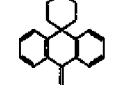

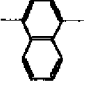
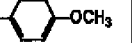
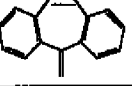


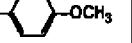


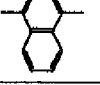
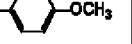
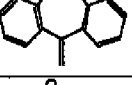


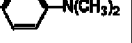
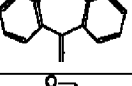



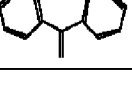

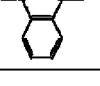

[0069]

[Table 20]

例示化合物No		Ar^3	Ar^4	n	R^1	Ar^5	Ar^6
134				0	H	H	
135				0	H	H	
136				0	H	H	
137				0	H	H	
138				0	H	H	
139				0	H	H	
140				0	H	H	

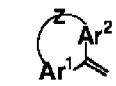
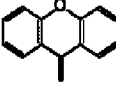



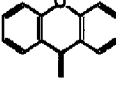


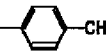
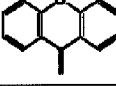



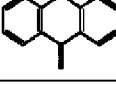


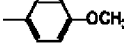
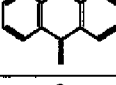


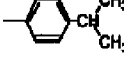
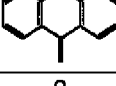


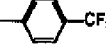
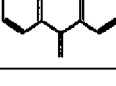


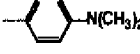
[0070]

[Table 21]

例示化合物No		Ar^3	Ar^4	n	R^1	Ar^5	Ar^6
141				0	H	H	
142				0	H	H	
143				0	H	H	
144				0	H	H	
145				0	H	H	
146				0	H	H	
147				0	H	H	


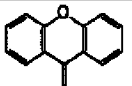


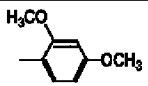
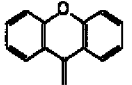


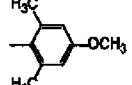
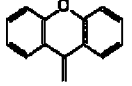



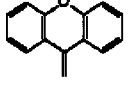


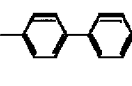
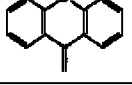


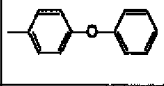
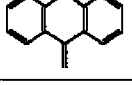


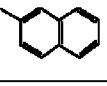
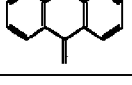


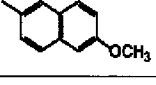
[0071]

[Table 22]

例示化合物No		Ar^3	Ar^4	n	R^1	Ar^5	Ar^6
148				0	H	H	
149				0	H	H	
150				0	H	H	
151				0	H	H	
152				0	H	H	
153				0	H	H	
154				0	H	H	


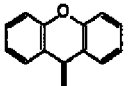



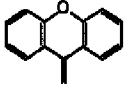



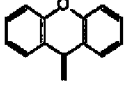


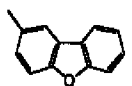
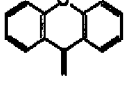


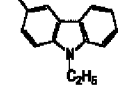
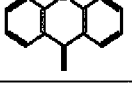



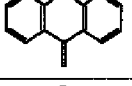


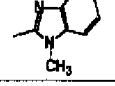
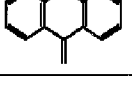


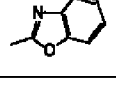
[0072]

[Table 23]

例示化合物No		Ar^3	Ar^4	n	R^1	Ar^5	Ar^6
155				0	H	H	
156				0	H	H	
157				0	H	H	
158				0	H	H	
159				0	H	H	
160				0	H	H	
161				0	H	H	

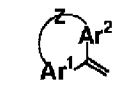
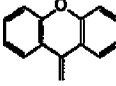



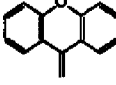


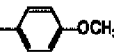
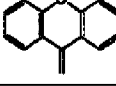


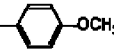
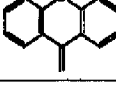




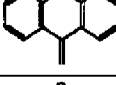




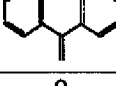




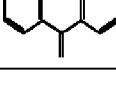



[0073]

[Table 24]

例示化合物No		Ar^3	Ar^4	n	R^1	Ar^5	Ar^6
162				0	H	H	
163				0	H	H	
164				0	H	H	
165				0	H	H	
166				0	H	H	
167				0	H	H	
168				0	H	H	

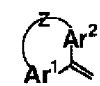
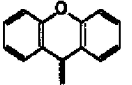


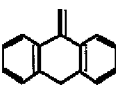
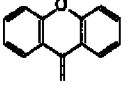


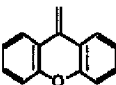
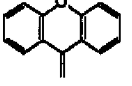


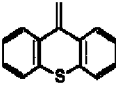
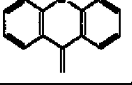


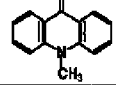
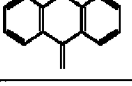


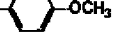
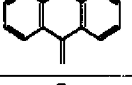




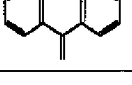




[0074]

[Table 25]

例示化合物No		Ar^3	Ar^4	n	R^1	Ar^5	Ar^6
169				0	H	H	
170				0	H	$-CH_3$	
171				0	H	$-CH(CH_3)_2$	
172				0	H		
173				0	H		
174				0	H		
175				0	H		

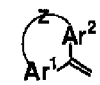
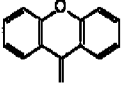




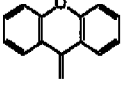


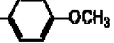
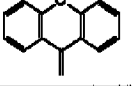
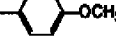

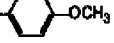
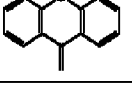


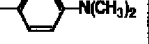
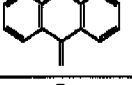
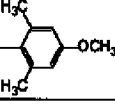

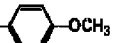
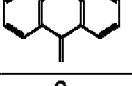


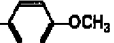
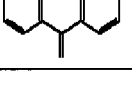
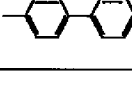

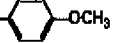
[0075]

[Table 26]

例示化合物No		Ar^3	Ar^4	n	R^1	Ar^5	Ar^6
176				0	H		
177				0	H		
178				0	H		
179				0	H		
180				0	$-CH_3$	H	
181				0	$-CH_3$		
182				1	H		


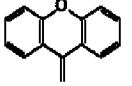
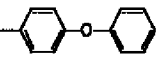
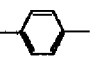
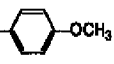
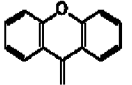
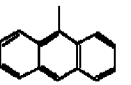
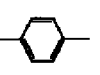
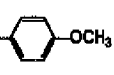
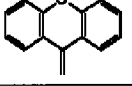
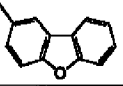
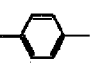
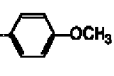
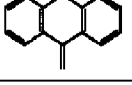
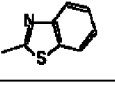
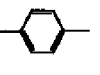
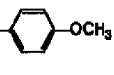
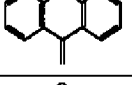
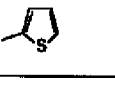
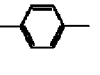
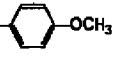
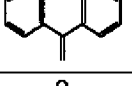
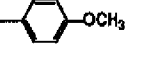
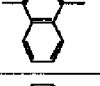

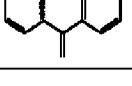
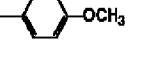
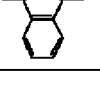
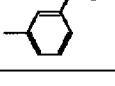
[0076]

[Table 27]

例示化合物No		Ar^3	Ar^4	n	R^1	Ar^5	Ar^6
183				2	H		
184				0	H	H	
185				0	H	H	
186				0	H	H	
187				0	H	H	
188				0	H	H	
189				0	H	H	


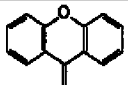
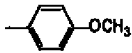

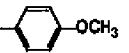
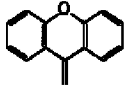


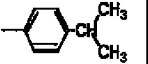
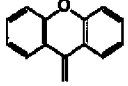
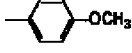

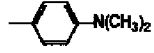
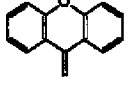
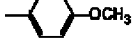

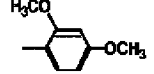
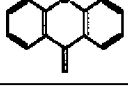
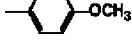


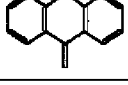
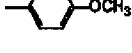

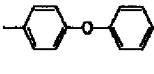
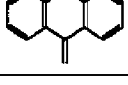
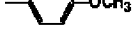

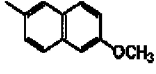
[0077]

[Table 28]

例示化合物No		Ar^3	Ar^4	n	R^1	Ar^5	Ar^6
190				0	H	H	
191				0	H	H	
192				0	H	H	
193				0	H	H	
194				0	H	H	
195				0	H	H	
196				0	H	H	


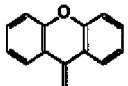
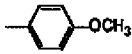


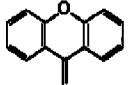
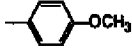


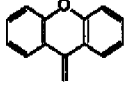
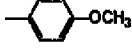


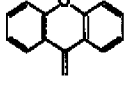
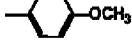


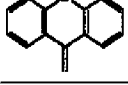
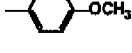


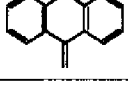
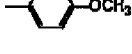

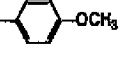
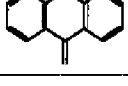
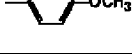



[0078]

[Table 29]

例示化合物No		Ar^3	Ar^4	n	R^1	Ar^5	Ar^6
197				0	H	H	
198				0	H	H	
199				0	H	H	
200				0	H	H	
201				0	H	H	
202				0	H	H	
203				0	H	H	

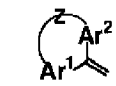
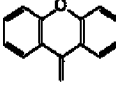




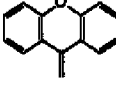
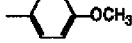

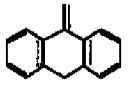
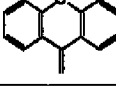
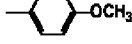

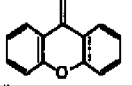
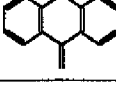


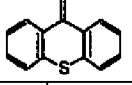
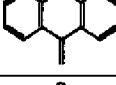
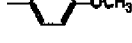



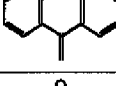




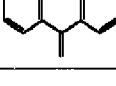
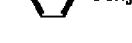



[0079]

[Table 30]

例示化合物No		Ar^3	Ar^4	n	R^1	Ar^5	Ar^6
204				0	H	H	
205				0	H	H	
206				0	H	H	
207				0	H	H	
208				0	H	H	
209				0	H	$-CH_3$	
210				0	H		

[0080]

[Table 31]

例示化合物No		Ar^3	Ar^4	n	R^1	Ar^5	Ar^6
211				0	H		
212				0	H		
213				0	H		
214				0	H		
215				0	$-CH_3$		
216				1	H		
217				2	H		

[0081]

[Table 32]

例示化合物No		Ar ³	Ar ⁴	n	R ¹	Ar ⁵	Ar ⁶
218				0	H	H	
219				0	H	H	
220				0	H	H	
221				0	H	H	
222				0	H	H	
223				0	H	H	
224				0	H	H	


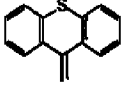


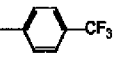
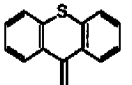


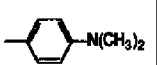
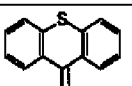


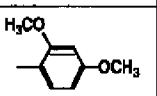
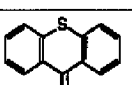


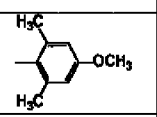
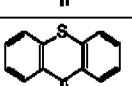



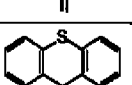



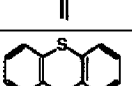


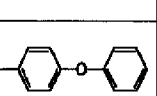
[0082]

[Table 33]

例示化合物No		Ar ³	Ar ⁴	n	R ¹	Ar ⁵	Ar ⁶
225				0	H	H	
226				0	H	H	
227				0	H	H	
228				0	H	H	
229				0	H	H	
230				0	H	H	
231				0	H	H	

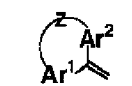
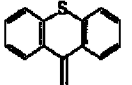



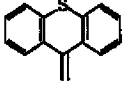


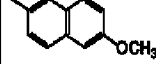
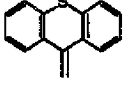



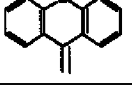



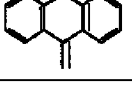



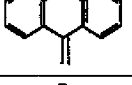



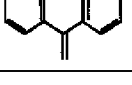



[0083]

[Table 34]

例示化合物No		Ar^3	Ar^4	n	R^1	Ar^5	Ar^6
232				0	H	H	
233				0	H	H	
234				0	H	H	
235				0	H	H	
236				0	H	H	
237				0	H	H	
238				0	H	H	


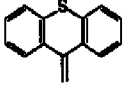



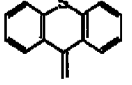



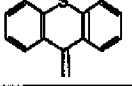



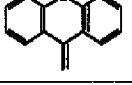



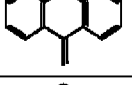



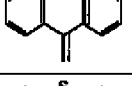




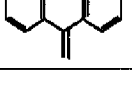




[0084]

[Table 35]

例示化合物No		Ar^3	Ar^4	n	R^1	Ar^5	Ar^6
239				0	H	H	
240				0	H	H	
241				0	H	H	
242				0	H	H	
243				0	H	H	
244				0	H	H	
245				0	H	H	


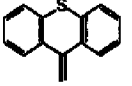




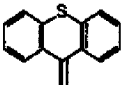



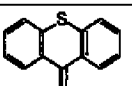


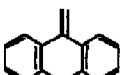
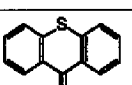


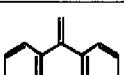
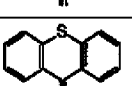


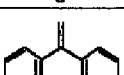
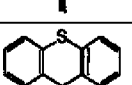


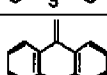
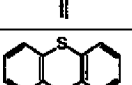


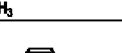
[0085]

[Table 36]

例示化合物No		Ar^3	Ar^4	n	R^1	Ar^5	Ar^6
246				0	H	H	
247				0	H	H	
248				0	H	H	
249				0	H	$-CH_3$	
250				0	H	$-CH(CH_3)_2$	
251				0	H		
252				0	H		


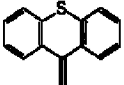




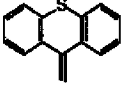




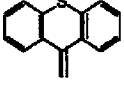




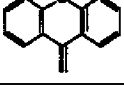
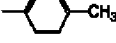

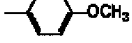
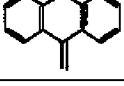
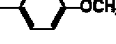


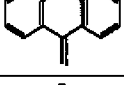
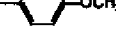

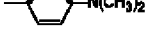
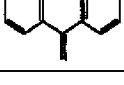
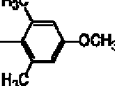


[0086]

[Table 37]

例示化合物No		Ar^3	Ar^4	n	R^1	Ar^5	Ar^6
253				0	H		
254				0	H		
255				0	H		
256				0	H		
257				0	H		
258				0	H		
259				0	$-CH_3$	H	


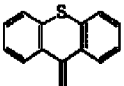



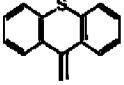
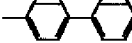


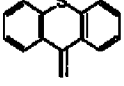
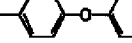


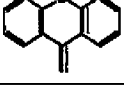
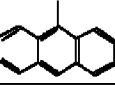


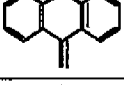
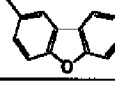

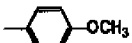
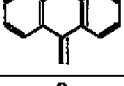


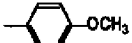
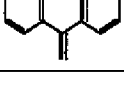



[0087]

[Table 38]

例示化合物No		Ar^3	Ar^4	n	R^1	Ar^5	Ar^6
260				0	$-CH_3$		
261				1	H		
262				2	H		
263				0	H	H	
264				0	H	H	
265				0	H	H	
266				0	H	H	

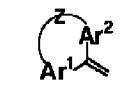
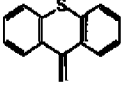



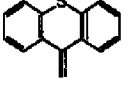
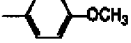


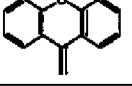
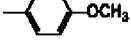


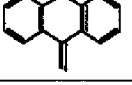
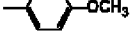


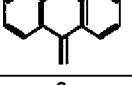



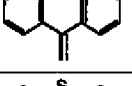



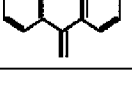
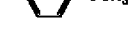


[0088]

[Table 39]

例示化合物No		Ar^3	Ar^4	n	R^1	Ar^5	Ar^6
267				0	H	H	
268				0	H	H	
269				0	H	H	
270				0	H	H	
271				0	H	H	
272				0	H	H	
273				0	H	H	

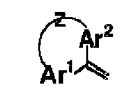
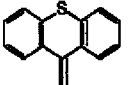
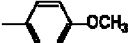

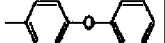
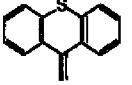
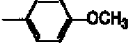

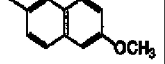
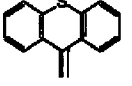
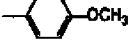

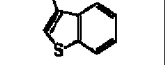
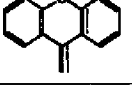
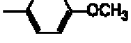

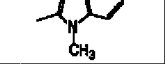
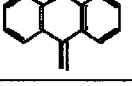
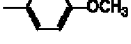

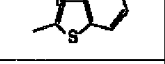
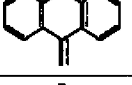


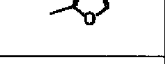
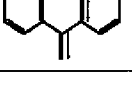


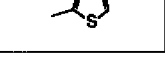
[0089]

[Table 40]

例示化合物No		Ar^3	Ar^4	n	R^1	Ar^5	Ar^6
274				0	H	H	
275				0	H	H	
276				0	H	H	
277				0	H	H	
278				0	H	H	
279				0	H	H	
280				0	H	H	


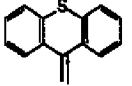


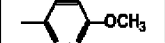
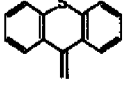
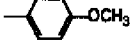



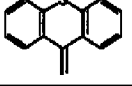
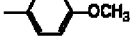



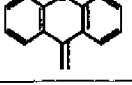


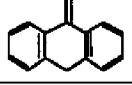
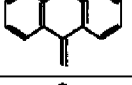
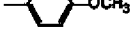

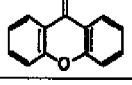
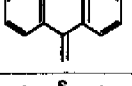


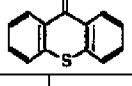
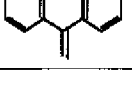




[0090]

[Table 41]

例示化合物No		Ar^3	Ar^4	n	R^1	Ar^5	Ar^6
281				0	H	H	
282				0	H	H	
283				0	H	H	
284				0	H	H	
285				0	H	H	
286				0	H	H	
287				0	H	H	


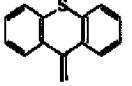




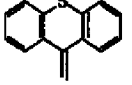
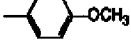



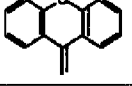
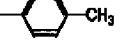

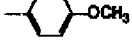
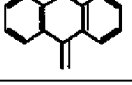
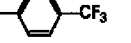


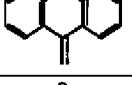
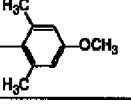

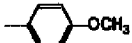
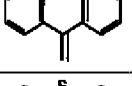


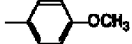
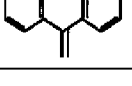
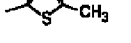

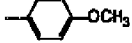
[0091]

[Table 42]

例示化合物No		Ar^3	Ar^4	n	R^1	Ar^5	Ar^6
288				0	H	$-CH_3$	
289				0	H		
290				0	H		
291				0	H		
292				0	H		
293				0	H		
294				0	$-CH_3$		

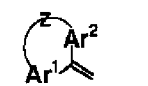
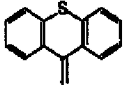



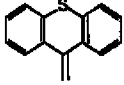

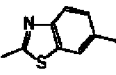

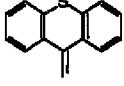

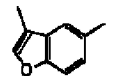
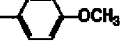
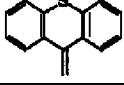

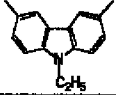
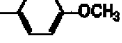
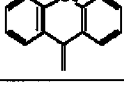


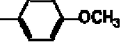
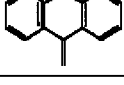
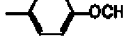

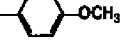
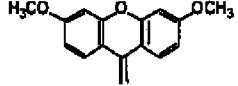



[0092]

[Table 43]

例示化合物No		Ar^3	Ar^4	n	R^1	Ar^5	Ar^6
295				1	H		
296				2	H		
297				0	H	H	
298				0	H	H	
299				0	H	H	
300				0	H	H	
301				0	H	H	

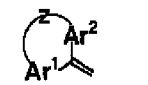
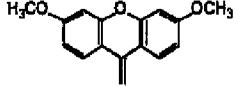


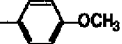
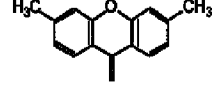



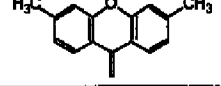



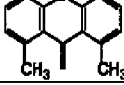


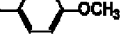
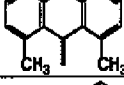


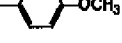
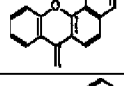


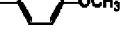
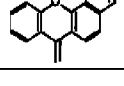
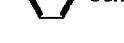


[0093]

[Table 44]

例示化合物No		Ar ³	Ar ⁴	n	R ¹	Ar ⁵	Ar ⁶
302				0	H	H	
303				0	H	H	
304				0	H	H	
305				0	H	H	
306				0	H	H	
307				0	H	H	
308				0	H	H	

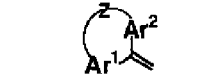
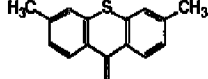
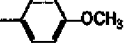

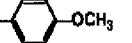
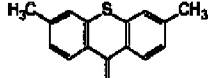
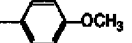
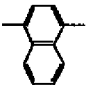
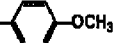
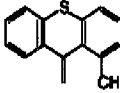
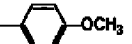

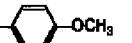
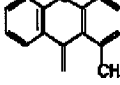
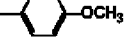
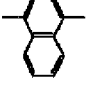
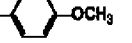
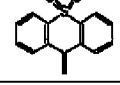
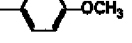

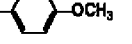
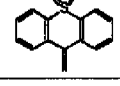

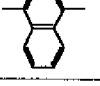

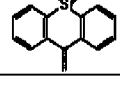



[0094]

[Table 45]

例示化合物No		Ar ³	Ar ⁴	n	R ¹	Ar ⁵	Ar ⁶
309				0	H	H	
310				0	H	H	
311				0	H	H	
312				0	H	H	
313				0	H	H	
314				0	H	H	
315				0	H	H	


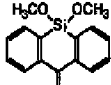
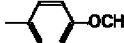

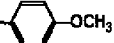
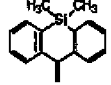


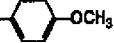
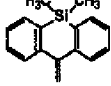


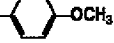
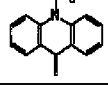



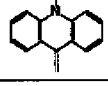



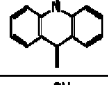



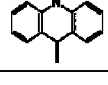


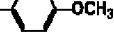
[0095]

[Table 46]

例示化合物No		Ar^3	Ar^4	n	R^1	Ar^5	Ar^6
316				0	H	H	
317				0	H	H	
318				0	H	H	
319				0	H	H	
320				0	H	H	
321				0	H	H	
322				0	H	H	


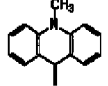


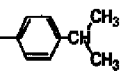
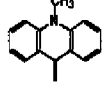



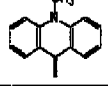


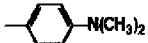
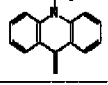


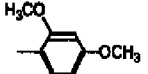
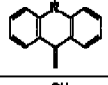


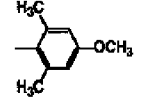
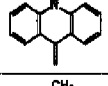



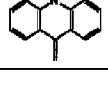


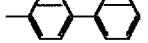
[0096]

[Table 47]

例示化合物No		Ar^3	Ar^4	n	R^1	Ar^5	Ar^6
323				0	H	H	
324				0	H	H	
325				0	H	H	
326				0	H	H	
327				0	H	H	
328				0	H	H	
329				0	H	H	

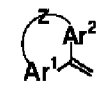
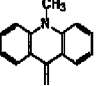


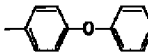
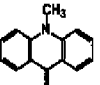



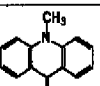


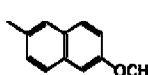
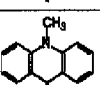



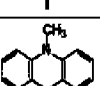


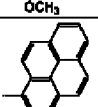
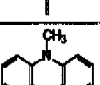


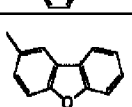
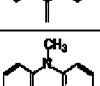


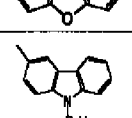
[0097]

[Table 48]

例示化合物No		Ar^3	Ar^4	n	R^1	Ar^5	Ar^6
330				0	H	H	
331				0	H	H	
332				0	H	H	
333				0	H	H	
334				0	H	H	
335				0	H	H	
336				0	H	H	

[0098]

[Table 49]

例示化合物No		Ar^3	Ar^4	n	R^1	Ar^5	Ar^6
337				0	H	H	
338				0	H	H	
339				0	H	H	
340				0	H	H	
341				0	H	H	
342				0	H	H	
343				0	H	H	

[0099]

[Table 50]

例示化合物No		Ar^3	Ar^4	n	R^1	Ar^5	Ar^6
344				0	H	H	
345				0	H	H	
346				0	H	H	
347				0	H	H	
348				0	H	$-CH_3$	
349				0	H	$-CH(CH_3)_2$	
350				0	H		


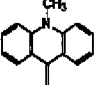

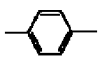
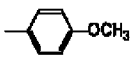
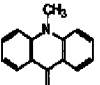

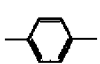


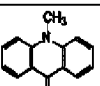

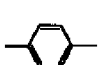


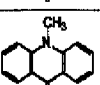




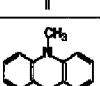
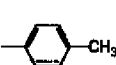

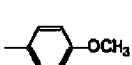
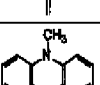
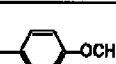
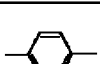
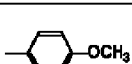
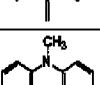
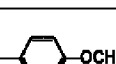


[0100]

[Table 51]

例示化合物No		Ar^3	Ar^4	n	R^1	Ar^5	Ar^6
351				0	H		
352				0	H		
353				0	H		
354				0	H		
355				0	H		
356				0	H		
357				0	H		

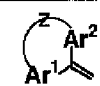
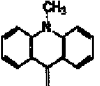
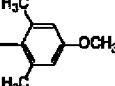


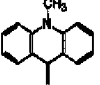


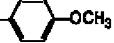
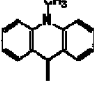


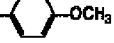
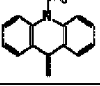
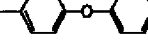

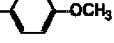
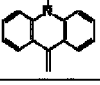
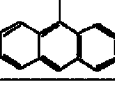

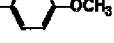
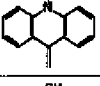



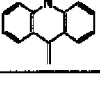



[0101]

[Table 52]

例示化合物No		Ar ³	Ar ⁴	n	R ¹	Ar ⁵	Ar ⁶
358				0	-CH ₃	H	
359				0	-CH ₃		
360				1	H		
361				2	H		
362				0	H	H	
363				0	H	H	
364				0	H	H	

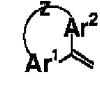
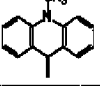


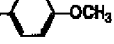
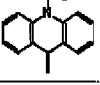



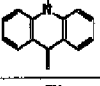
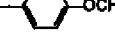


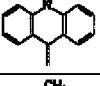



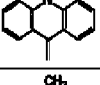


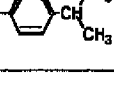
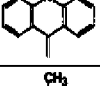


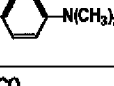
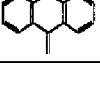


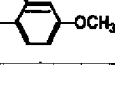
[0102]

[Table 53]

例示化合物No		Ar^3	Ar^4	n	R^1	Ar^5	Ar^6
365				0	H	H	
366				0	H	H	
367				0	H	H	
368				0	H	H	
369				0	H	H	
370				0	H	H	
371				0	H	H	


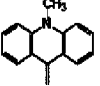
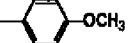


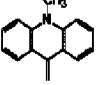
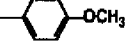

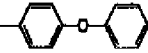
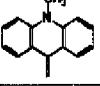
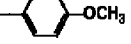

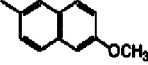
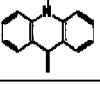
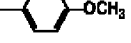


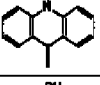



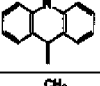



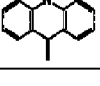
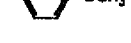


[0103]

[Table 54]

例示化合物No		Ar^3	Ar^4	n	R^1	Ar^5	Ar^6
372				0	H	H	
373				0	H	H	
374				0	H	H	
375				0	H	H	
376				0	H	H	
377				0	H	H	
378				0	H	H	

[0104]

[Table 55]

例示化合物No		Ar^3	Ar^4	n	R^1	Ar^5	Ar^6
379				0	H	H	
380				0	H	H	
381				0	H	H	
382				0	H	H	
383				0	H	H	
384				0	H	H	
385				0	H	H	

[0105]

[Table 56]

例示化合物No		Ar^3	Ar^4	n	R^1	Ar^5	Ar^6
386				0	H	H	
387				0	H	$-CH_3$	
388				0	H		
389				0	H		
390				0	H		
391				0	H		
392				0	H		

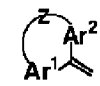
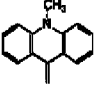
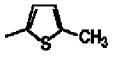

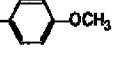
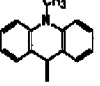
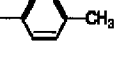

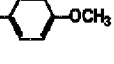
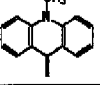
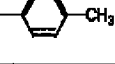
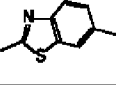
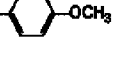
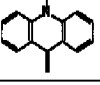

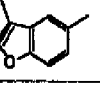
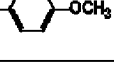
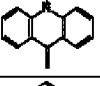

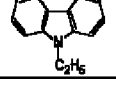
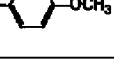
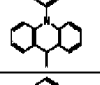
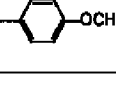
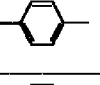
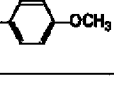
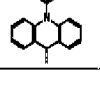
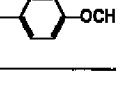

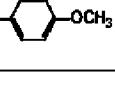
[0106]

[Table 57]

例示化合物No		Ar^3	Ar^4	n	R^1	Ar^5	Ar^6
393				0	$-CH_3$		
394				1	H		
395				2	H		
396				0	H	H	
397				0	H	H	
398				0	H	H	
399				0	H	H	


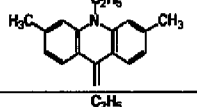
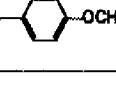
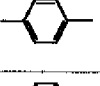
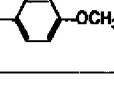
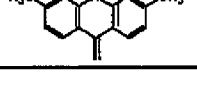



[0107]

[Table 58]

例示化合物No		Ar^3	Ar^4	n	R^1	Ar^5	Ar^6
400				0	H	H	
401				0	H	H	
402				0	H	H	
403				0	H	H	
404				0	H	H	
405				0	H	H	
406				0	H	H	

[0108]

[Table 59]

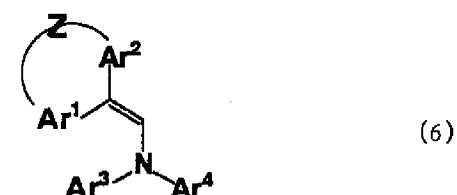
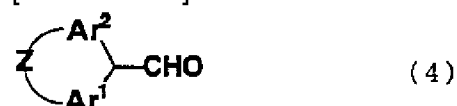
例示化合物No		Ar^3	Ar^4	n	R^1	Ar^5	Ar^6
407				0	H	H	
408				0	H	H	

[0109]Conventionally, using a publicly known method, the enamine compounds of this invention can be boiled that it is the following, and can be easily manufactured by low cost.

[0110]First, the enamine intermediate shown with the following structural formula (6) is manufactured by carrying out the dehydrating condensation reaction of the secondary amine compound shown with the aldehyde compound shown with a following general formula (4), and a following general formula (5).

[0111]

[Formula 10]



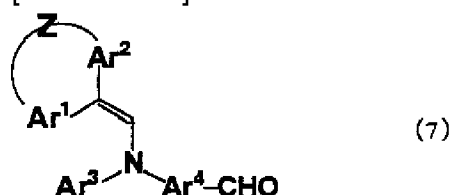
[0112](said general formula (4) In - (6), Ar¹, Ar², Ar³, Ar⁴, and Z are synonymous with what was defined in said general formula (1).)

[0113]This dehydrating condensation reaction is performed as follows, for example. The secondary amine compound shown by said general formula (5) of the aldehyde compound shown by said general formula (4) and an equimolecular amount is dissolved in solvents, such as a nonpolar solvent, alcohols, ether, and ketone, and a solution is prepared. As an example of the solvent to be used, toluene, xylene, chlorobenzene, butanol, diethylene glycol dimethyl ether, methyl isobutyl ketone, etc. are mentioned. Acid catalysts, such as p-toluenesulfonic acid, camphor sulfonic acid, and pyridinium p-toluenesulfonic acid, are added to the prepared solution, for example, and it heats, and is made to react. The quantity of the acid catalyst to add of 1/-ten to 1/1000 mol equivalent is 1 / 25 to 1/500 mol equivalent preferably to said aldehyde compound, and their 1 / 50 to 1/200 mol equivalent are the optimal. In order that water may sub** and may bar a reaction during a reaction, azeotropy of the generated water is carried out to a solvent, and it removes besides a system. The enamine intermediate shown by said general formula (6) by this can be manufactured with high yield.

[0114]Next, an enamine aldehyde intermediate shown with a following general formula (7) is manufactured by formylating an enamine intermediate shown by said general formula (6).

[0115]

[Formula 11]



[0116](Ar¹, Ar², Ar³, Ar⁴, and Z are synonymous with what was defined in said general formula

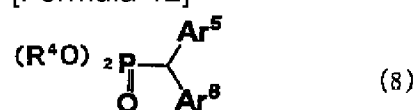
(1) among a formula.)

[0117]This formylation reaction is performed as follows, for example. A BIRUSU Meyer's reagent is prepared by phosphorus oxychloride, N,N-dimethylformamide, an N-methyl-N-phenylformamide, or a N,N-diphenylformamide among N,N-dimethylformamide or the solvent of 1,2-dichloroethane. Into the solution which contains a 1.0 to 1.3-Eq BIRUSU Meyer's reagent to the enamine intermediate shown by said general formula (6), 1.0 Eq of enamine intermediates shown by said general formula (6) are added, and heating churning is carried out at 60-110 °C for 2- 8 hours. Then, it hydrolyzes by 1-8-N alkaline aqueous solutions, such as sodium hydroxide and a potassium hydrate. The enamine aldehyde intermediate shown by said general formula (7) by this can be manufactured.

[0118]Enamine compounds which have stilbene structure can be manufactured by making a Wittig reagent finally shown with an enamine aldehyde intermediate shown by said general formula (7), and a following general formula (8) react under basic conditions.

[0119]

[Formula 12]



[0120](Ar⁵ and Ar⁶ are synonymous with what was defined in said general formula (1) among a formula.) R⁴ shows the aryl group which may also contain the alkyl group which may also contain a substituent, or a substituent.

[0121]This Wittig-Horner reaction is performed as follows, for example. 1.0-1.2 Eq of Wittig reagents shown by said general formula (8) among diethylether, a tetrahydrofuran (THF), ethyleneglycol dimethyl ether, or the solvent of dimethyl sulfoxide, Stable Wittig ylide is made to generate from 1.0-1.5 Eq of metal alkoxide bases, such as potassium t-butoxide, a sodium ethoxide, and sodium methoxide. 1.0 Eq of enamine aldehyde intermediates shown by said general formula (7) in this solution are added, and heating churning is carried out at a room temperature or 30-60 °C for 2- 8 hours. The enamine compounds shown by said general formula (1) by this can be manufactured.

[0122]Said general formula (1) Since enamine compounds shown by - (3) have high charge mobility, optical response sufficient by high sensitivity is shown, and this character is maintained also under low temperature environment. Therefore, a device which was excellent in a response can be provided by using it for an electro photography photo conductor, a sensor material, an EL element, an electrostatic recording element, etc. by using as an organic photoconductivity material enamine compounds which have such the characteristic.

[0123]As what was excellent from viewpoints of the characteristic, cost, manufacture, etc.

among the above-mentioned enamine compounds especially, Ar¹ and Ar² A phenyl group or p-tolyl group, A nitrogen atom in which Z has a methylene chain, an oxygen atom, a sulfur atom, or a methyl group, Ar³ A phenyl group, a naphthyl group, a biphenyl group, p-tolyl group, p-anisyl group, a benzo thiophenyl group, or N-methyl indolyl group, A phenylene group or a naphthylene group, Ar⁵, and Ar⁶ Ar⁴ A phenyl group, A thing a naphthyl group, a biphenyl group, m-tolyl group, p-anisyl group, a benzothiazolyl group, N-methyl indolyl group or a hydrogen atom, and whose R¹ are hydrogen atoms and whose n is 0 is mentioned.

[0124]Enamine compounds shown by said general formula (1) - (3) are used for an electro photography photo conductor by this invention as charge transport material, and it has various embodiments. Hereafter, with reference to figures, it explains in detail.

[0125]Drawing 1 is a sectional view showing typically an example of an electro photography photo conductor which has a lamination type photosensitive layer which has the charge transport layer 6 on the charge generating layer 5. It is a lamination type photo conductor which comprises lamination with the charge generating layer 5 distributed in binder resin by using charge generating material 2 as the main ingredients as the photosensitive layer 4, and the charge transport layer 6 distributed in binder resin by using charge transport material 3 as the main ingredients on the conductive substrate 1. The charge transport layer 6 is formed in the surface of the charge generating layer 5, and the above-mentioned enamine compounds contain as the charge transport material 3 in this charge transport layer 6.

[0126]Drawing 2 is a sectional view showing an example which has the interlayer 8 in an electro photography photo conductor of drawing 1. Composition of a lamination type photo conductor which comprises lamination which formed the interlayer 8 between the conductive substrate 1, drawing 1, and the same photosensitive layer 4 is shown.

[0127]Drawing 3 is a sectional view showing typically an example which has the interlayer 8 in an electro photography photo conductor which has a distributed photosensitive layer which has the charge generating material 2 and the charge transport material 3 in the same layer. The interlayer 8 is formed on the conductive substrate 1, and composition of a monolayer type photo conductor which comprises on it a monolayer which distributed the charge generating material 2 and the charge transport material 3 in binder resin as the photosensitive layer 7 is shown.

[0128]The electro photography photo conductor by an embodiment of the invention can take various lamination by considering drawing 1 - 3 as typical composition.

[0129]As the conductive substrate 1, aluminum, an aluminum alloy, copper, zinc, Metal drums, such as stainless steel and titanium, a sheet, polyethylene terephthalate, A metallic foil lamination and metal deposition processing are performed on polymer materials, such as nylon and polystyrene, hard paper, and glass, Or a drum, a sheet, a seamless belt, etc. which vapor-

deposited or applied a layer of conductive compounds, such as a conductive polymer, tin oxide, and indium oxide, are mentioned.

[0130] Scattered reflection processing of carrying out surface roughening of the surface of a surface treatment by anodic oxide film processing, medicine, hot water, etc., coloring processing, and a conductive substrate to the surface of the conductive substrate 1 in the range which does not have influence in image quality if needed is performed. It may be made to prevent an image defect by interference of a laser beam in which wavelength was ready. That is, it is because a laser beam which entered, and light reflected within an electro photography photo conductor cause interference in an electrophotography process using laser as an exposure light source, this interference fringe appears on a picture and an image defect is caused.

[0131] The interlayer 8 prevents an image defect in a reversal development process, and is provided between the conductive substrate 1 and the photosensitive layer 4 or 7 for the purpose of covering of a defect on the surface of a conductive substrate, an improvement of electrostatic property, adhesive improvement in a photosensitive layer, a spreading nature improvement of a photosensitive layer, etc. Since a toner image is formed in a portion into which surface charge of an exposure part decreased in number when forming a picture especially using a reversal development process, if surface charge decreases in number by factors other than exposure, fogging of a picture of black Poti etc. where a toner adheres to a white ground will occur, and remarkable degradation of image quality will be produced. That is, since it becomes a remarkable image defect of fogging called a minute sunspot (black Poti) to which a toner adheres to a white ground when it originates in a defect of the conductive substrate 1 and the photosensitive layer 4 or 7 and a fall of electrostatic property in a minute field arises occurring, it prevents by the interlayer 8.

[0132] As the interlayer's 8 material, a resin material containing various resin materials, metal particles, a metallic oxide particle, etc. is used. As an example of a metallic oxide particle, titanium oxide, an aluminum oxide, aluminium hydroxide, tin oxide, etc. are mentioned, for example. As a material used when forming an interlayer by a resin monolayer, Polyethylene resin, polypropylene resin, polystyrene resin, an acrylic resin, Vinyl chloride resin, vinyl acetate resin, polyurethane resin, an epoxy resin, Resin materials, such as polyester resin, melamine resin, silicone resin, polyvinyl butyral resin, and polyamide resin, Copolymer resin, casein, gelatin, polyvinyl alcohol, ethyl cellulose, etc. containing two or more of monomers which constitute these resin are known. Among these, especially polyamide resin is preferred and Nylon of alcoholic fusibility can be used as more desirable polyamide resin. . For example, carried out copolymerization of 6-nylon, 66-nylon, 610-nylon, 11-nylon, the 12-nylon, etc. Like what is called copolyamide, N-alkoxy methyl denaturation nylon, and N-alkoxy ethyl denaturation nylon, a type which denatured nylon chemically is preferred.

[0133]In the interlayer 8, metallic oxides, such as titanium oxide, are made to contain, a volume resistance value in the interlayer 8 is adjusted, and while preventing pouring of an electric charge from the conductive substrate 1, the electrical property of a photo conductor under various environment may be maintained. In this case, in a solution in which a solvent was made to dissolve the above-mentioned resin, metallic oxides, such as titanium oxide, can be distributed and intermediate layer coating liquid can be prepared. Water and various organic solvents are used as a solvent. Especially in an independent solvent of water, methanol, ethanol, and butanol, and a row. Chlorinated solvents, such as water, alcohols, two or more kinds of alcohols, acetone, dioxolane, etc. alcohols and a dichloroethane, chloroform, trichloroethane, and a partially aromatic solvent of alcohols are preferred.

[0134]As a dispersion method of intermediate layer coating liquid, general methods, such as a ball mill, a sand mill, attritor, a vibration mill, and an ultrasonic dispersion machine, are applicable. As for resin in intermediate layer coating liquid, and the total content A of a metallic oxide, it is preferred that A/B is a weight ratio of 3 / 97 - 20/80 to the quantity B of a solvent currently used for intermediate layer coating liquid. As for resin/metallic oxide, it is preferred that it is 90 / 10 - 1/99 in a weight ratio, and 70 / 30 - 5/95 are still more preferred.

[0135]The interlayer 8 can be formed by applying intermediate layer coating liquid which was distributed in this way and prepared on the conductive substrate 1. As a coating method, a spray method, the bar coat method, the roll coat method, the braid method, Ling's method, dip coating, etc. are mentioned. Optimal method can be chosen from among these coating methods, taking physical properties, productivity, etc. of spreading into consideration. When using a dip coating method, after the conductive substrate 1 is immersed in a spreading tub which filled intermediate layer coating liquid, the interlayer 8 is formed by pulling up at constant speed or speed which changes one by one. Thus, this dip coating method is comparatively easy, and since it excels in respect of productivity and the cost price, when manufacturing an electro photography photo conductor, it is used mostly. In order to stabilize the dispersibility of coating liquid, a coating liquid dispersion device represented by sonicator may be formed in a device used for a dip coating method.

[0136]The 0.05-micrometer or more range of 0.01 micrometers or more 20 micrometers or less of the interlayer's 8 thickness is 10 micrometers or less more preferably. If the interlayer's 8 thickness is thinner than 0.01 micrometer, it will not function as the interlayer 8 substantially. That is, it becomes impossible to be unable to cover a defect of the conductive substrate 1, and to obtain uniform surface nature, but to prevent pouring of an electric charge from the conductive substrate 1, and a fall of electrostatic property arises. When carrying out dip coating of the interlayer 8, it is not preferred to make the interlayer's 8 thickness thicker than 20 micrometers in order for manufacture of a photo conductor to become difficult and for sensitivity of a photo conductor to fall.

[0137]As an effective substance as the charge generating material 2, azo pigment, such as monoazo, screwazo, and tris azo pigment, Perylene system paints, such as indigo system paints, such as indigo and a thioindigo, perylene imide, and a perylene acid anhydride, Phthalocyanine pigment, such as polycyclic quinone system paints, such as anthraquinone and pyrene quinone, metal phthalocyanines, and nonmetallic phthalocyanine, Inorganic materials, such as squarylium coloring matter, pyrylium salt and thio pyrylium salt, triphenylmethane dye, selenium, and amorphous silicon, are mentioned. Such charge generating material may be used independently, or two or more kinds may be combined and it may be used.

[0138]Said charge generating material 2 Methyl Violet, Crystal Violet, Triphenylmethane dye represented by night blue, Victoria blue, etc., Acridine dye represented by erythrosine, rhodamine B, the rhodamine 3R, an acridine orange, hula PEOSHIN, etc., It may combine with sensitization colors, such as an oxazine color represented by thiazine dye, Capri blue, a meld rubble, etc. which are represented in methylene blue, methylene green, etc., other cyanine dye, a styryl color, a pyrylium salt color, and a thio pyrylium salt color.

[0139]There are a method of forming said charge generating material 2 by carrying out vacuum deposition as a formation method of the charge generating layer 5 and a method of carrying out mixture dispersion and forming membranes in an organic solvent which dissolved binder resin. After distributing the charge generating material 2 by a publicly known method in a binder resin solution, a method of applying is [among these] preferred.

[0140]As binder resin used for the charge generating layer 5, Polyester resin, polystyrene resin, polyurethane resin, phenol resin, An alkyd resin, melamine resin, an epoxy resin, silicone resin, an acrylic resin, Resin, such as methacrylic resin, polycarbonate resin, polyarylate resin, phenoxy resin, polyvinyl butyral resin, and polyvinyl formal resin, and copolymer resin containing two or more of repeating units of these resin are used. As this copolymer resin, insulating resin, such as polyvinyl chloride acetate copolymer resin, VCM/PVC acetic acid vinyl-maleic anhydride copolymer resin, and acrylonitrile styrene copolymer resin, can be mentioned, for example. all the resin which binder resin is not limited to these and is generally used -- two or more sorts can use it, being able to be independent or mixing.

[0141]As a solvent which dissolves these binder resin, Halogenated hydrocarbon, such as dichloromethane and a dichloroethane, acetone, Ester species, such as ketone, such as methyl ethyl ketone and cyclohexanone, ethyl acetate, and butyl acetate, Ether, such as a tetrahydrofuran (THF) and dioxane, Aprotic polar solvents, such as aromatic hydrocarbon, such as cellosolves, such as dimethoxyethane, benzene, toluene, and xylene, N,N-dimethylformamide, and N,N-dimethylacetamide, these partially aromatic solvents, etc. can be used.

[0142]A compounding ratio of the charge generating material 2 and binder resin has a preferred range whose rates of the charge generating material 2 are 10 % of the weight - 99 % of the weight. Since a coarse particle increases in order for sensitivity to fall, and not only film strength of the charge generating layer 5 to fall, but for dispersibility to fall when large when less than this range, an image defect, especially black Poti increase.

[0143]Before carrying out mixture dispersion processing of the charge generating material 2 into a binder resin solution, grinding treatment of the binder resin may be beforehand carried out with a grinder. As a grinder used for the grinding, a ball mill, a sand mill, attritor, a vibration mill, an ultrasonic dispersion machine, etc. are mentioned. Suitable conditions are chosen so that mixing of an impurity by wear etc. of a container and dispersion media to be used may not take place as dispersion conditions.

[0144]As a coating method of a binder resin solution which carried out mixture dispersion processing of the charge generating material 2, a spray method, the bar coat method, the roll coat method, the braid method, Ling's method, dip coating, etc. are mentioned. Especially a dip coating method is comparatively easy as mentioned above, and since it excels in respect of productivity and the cost price, also when forming the charge generating layer 5, it is used mostly.

[0145]The 0.1-micrometer or more range of 0.05 micrometers or more 5 micrometers or less of thickness of the charge generating layer 5 is 1 micrometer or less more preferably.

[0146]The charge transport layer 6 is obtained by making one or more kinds and binder resin contain enamine compounds shown by said general formula (1) - (3). Since electrification potential and mobility are high as mentioned above, these enamine compounds have a good optical response at high sensitivity. Even if it shows and uses sufficient optical response repeatedly under low temperature environment, those characteristics do not change.

Therefore, by using said enamine compounds as the charge transport material 3, it excels in endurance by high sensitivity, and also when it uses by the bottom of low temperature environment, and a high speed process, an electro photography photo conductor in which sensitivity does not fall can be provided.

[0147]Other charge transport material 3 may be mixed and used for the charge transport layer 6 not only by enamine compounds shown by said general formula (1) - (3) but by a case. As the charge transport material 3 of these others, a carbazole derivative, an oxazole derivative, An oxadiazole derivative, a thiazole derivative, a thiadiazole derivative, A triazole derivative, an imidazole derivative, an imidazoline derivative, an imidazolidine derivative, A screw imidazolidine derivative, a styryl compound, a hydrazone compound, a polynuclear aromatic compound, Indole derivatives, a pyrazoline derivative, an oxazoline derivative, a benzimidazole derivative, a quinazoline derivative, a benzofuran derivative, an acridine derivative, a phenazine derivative, an amino stilbene derivative, and doria -- a reel amine

derivative and doria -- a reel methane derivative, a phenylenediamine derivative, a stilbene derivative, and a benzidine derivative are mentioned. Polysilane, such as polymer which has a basis which comprises these compounds in a main chain or a side chain, for example, poly-N-vinylcarbazole, Polly 1-vinylpyrene, and Polly 9-vinylanthracene, etc. are mentioned.

[0148]As binder resin of the charge transport layer 6, what has the charge transport material 3 and compatibility is chosen. For example, a vinyl polymerization object and its copolymers, such as polymethylmethacrylate, polystyrene, and polyvinyl chloride, And polycarbonate resin, polyester resin, polyester carbonate resin, Polysulfone resin, phenoxy resin, an epoxy resin, silicone resin, polyarylate resin, polyamide resin, polyurethane resin, polyacrylamide resin, and resin, such as phenol resin, are mentioned. These may be independent or may use thermosetting resin which could use it having mixed two or more sorts and which constructed the bridge selectively. A volume resistance value is more than 10^{13} ohm-cm, and especially resin, such as polystyrene, polycarbonate, polyarylate, and polyphenylene oxide, is excellent in coat nature, the potential characteristic, etc.

[0149]A weight ratio of enamine compounds/binder resin of an addition ratio to inside of the charge transport layer 6 of said binder resin and enamine compounds is generally about 10/12. Since the above-mentioned enamine compounds have high mobility, they can make content of binder resin high for a weight ratio of enamine compounds/binder resin as 10 / 12 - 10/30, with high sensitivity maintained. Thus, by making content of binder resin high, the print durability of the charge transport layer 6 can improve, and the endurance of an electro photography photo conductor by this embodiment can be raised. A weight ratio of enamine compounds/binder resin is smaller than 10/30, namely, if a ratio of binder resin becomes high, in order to cause viscosity increase of coating liquid, when producing a photo conductor drum by a dip coating method, a spreading speed fall is caused, and productivity gets remarkably bad. Since viscosity of coating liquid will decrease on the other hand if a ratio of binder resin becomes lower than 10/12, when producing a photo conductor drum by a dip coating method, even if it adjusts spreading speed, a problem that it becomes difficult to secure fitness thickness occurs. Since the increase degree of abrasion loss is large compared with the time when a ratio of binder resin is high even if thickness is securable, it becomes impossible to secure abrasion resistance.

[0150]In the charge transport layer 6, if needed, a publicly known plasticizer and a silicone series leveling agent are added conventionally, the processability of the photosensitive layer 4 and flexibility can be given, or surface smoothness can also be raised. As this plasticizer, there are a dibasic-acid-ester, fatty-acid-ester, phosphoric ester, phthalic ester, chlorinated paraffin, and epoxy type plasticizer etc., for example.

[0151]In the charge transport layer 6, particles of inorganic matter and an organic compound can be added, and an increase in a mechanical strength and improvement in an electrical

property can also be aimed at to it.

[0152]Furthermore, various additive agents, such as an antioxidant and a sensitizer, may also be included in the charge transport layer 6 if needed. Especially as an antioxidant, a hindered phenol derivative and a hindered amine derivative are preferred. As for a hindered phenol derivative, it is preferred to be contained 50 or less % of the weight 0.1% of the weight or more to the charge transport material 3, and, as for a hindered amine derivative, it is preferred to be contained 50 or less % of the weight 0.1% of the weight or more to the charge transport material 3. By this, the potential characteristic improves and stability as coating liquid also increases.

[0153]Formation of the charge transport layer 6 can be performed like the above-mentioned interlayer 8 and the charge generating layer 5, for example using a suitable organic solvent by spray method, the bar coat method, the roll coat method, the braid method, Ling's method, and dip coating. Since it excels in respect of versatility as mentioned above, many especially dip coating methods are used. As a spreading solvent, aromatic hydrocarbon, such as benzene, toluene, xylene, and monochlorobenzene, Halogenated hydrocarbon, such as dichloromethane and a dichloroethane, THF, Independent solvents, such as dioxane, dimethoxymethyl ether, and dimethylformamide, or two or more sorts of partially aromatic solvents are used, and solvents, such as alcohols, acetonitrile, and methyl ethyl ketone, can be used if needed, adding further.

[0154]As for thickness of the charge transport layer 6, 5-50 micrometers is preferred, and it is 10-40 micrometers of thickness more preferably.

[0155]In the case of a monolayer type photo conductor, mixture dispersion is carried out, coating liquid is prepared, and the photosensitive layer 7 of a monolayer is formed for said charge generating material 2, said charge transport material 3, and said binder resin at the suitable above-mentioned solvent the dissolution and by applying this coating liquid by said dip coating method. An addition ratio to the photosensitive layer 7 of said binder resin and enamine compounds and thickness of the photosensitive layer 7 are the same as that of a case of the above-mentioned lamination type photo conductor. The same additive agent as the photosensitive layer 4 can be added also to the photosensitive layer 7.

[0156]One more or more sorts of electronic acceptance substances and coloring matter are contained in the photosensitive layer 4 or 7, improvement in sensitivity is aimed at, and it may be made to suppress a rise, fatigue, etc. of rest potential at the time of repetition use. As this electronic acceptance substance, for example A succinic anhydride, a maleic anhydride, Cyano compounds, such as acid anhydrides, such as phthalic anhydride and 4-chloronaphthalic anhydride, tetracyanoethylene, and terephthal chestnut dinitrile, Anthraquinone, such as aldehyde, such as 4-nitrobenzaldehyde, anthraquinone, and 1-nitroanthraquinone. What polymers-ized many rings, such as 2,4,7-trinitro fluorenone and

2,4,5,7-tetranitro fluorenone, or a heterocyclic nitro compound, a diphenoquinone compound, and these electronic suction nature material can be used. As said coloring matter, organic photoconductivity compounds, such as a xanthene dye, thiazine dye, triphenylmethane dye, quinoline paints, and a copper phthalocyanine, can be used as an optical sensitization agent, for example.

[0157]A chemical adverse effect by an improvement of abrasiveness, ozone, nitrogen oxides, etc. of the photosensitive layer 4 or 7 can be prevented by providing a protective layer in the surface of the photosensitive layer 4 or 7.

[0158]On each class of a photo conductor, additive agents, such as antioxidants, such as a publicly known phenol system compound, a hydroquinone system compound, a tocopherol system compound, and an amine compound, an ultraviolet ray absorbent, and a sensitizer, may be added in proper quantity if needed conventionally. As for said antioxidant, it is preferred to be contained 50 or less % of the weight 0.1% of the weight or more to the charge transport material 3. The potential characteristic can improve by this, stability as coating liquid also increases, fatigue degradation at the time of repeating and using a photo conductor is reduced, or endurance can be raised.

[0159]Next, an image forming device provided with an electro photography photo conductor constituted as mentioned above is explained. An image forming device by an embodiment of the invention is not limited to the following description contents.

[0160]Drawing 4 is a lineblock diagram showing an outline of an image forming device provided with an electro photography photo conductor by an embodiment of the invention. Around the electro photography photo conductor 11, the electrifying device 32, the semiconductor laser 31, the development counter 33, the transfer electrification machine 34, the fixing assembly 35, and the cleaner 36 are arranged in order.

[0161]The drum-like electro photography photo conductor 11 is rotated with predetermined peripheral velocity in the direction of the arrow 41 by a driving means which is not illustrated. The photo conductor 11 receives uniform electrification of positive or negative prescribed potential in the peripheral surface by the electrifying device 32 of a contact process or a noncontact type in a rotation process. Subsequently, a laser beam from the semiconductor laser 31 is repeatedly scanned by the longitudinal direction (scanning direction) to the surface of the photo conductor 11, and an electrostatic latent image is formed in a peripheral surface of the photo conductor 11 one by one. A formed electrostatic latent image is developed as a toner image by the development counter 33 formed in the hand-of-cut downstream rather than an image formation point by the semiconductor laser 31.

[0162]Synchronizing with exposure to the photo conductor 11, the transfer paper 51 is given to the transfer electrification machine 34 of the development counter 33 further formed in the hand-of-cut downstream from the direction of the arrow 42, and a toner image is transferred by

the transfer paper 51. The transfer paper 51 is conveyed by the fixing assembly 35 with a transportation belt, and the transfer paper 51 is fixed to a toner image. Thus, paper is delivered to the transfer paper 51 with which a picture was formed. A toner which remains on the photo conductor 11 surface is cleaned by the cleaner 36 formed with an electric discharge lamp which the transfer electrification machine 34 is the hand-of-cut downstream further, and is not illustrated to the hand-of-cut upstream of the electrifying device 32. By furthermore rotating the photo conductor 11, the above rotation process is repeated and a picture is formed.

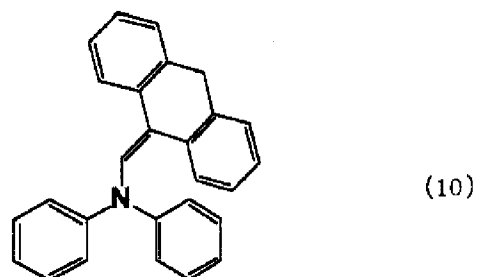
[0163]By carrying an electro photography photo conductor which contains the above-mentioned enamine compounds as charge transport material, it excels in endurance by high sensitivity, and also when it uses by the bottom of low temperature environment, and a high speed process, an image forming device with which the electrical property does not fall can be provided.

[0164](EXAMPLE) Although an example explains this invention still in detail below, this invention is not limited to these at all.

[0165][The synthetic example 1] In 70 ml of synthetic toluene of illustration compound No.4, 16.9 g (1.0 Eq) of diphenylamine, A reaction was performed for 6 hours, having added the aldehyde compound 21.9g (1.05 Eq) and DL-10-camphor sulfonic acid 0.23g (0.01 Eq) which are shown with the following structural formula (9), having heated, having carried out azeotropy of the water which sub^{**}(ed) to toluene, and removing besides a system. A reaction mixture was condensed about to 1/10 after ending reaction, it was gradually dropped into 100 ml of hexane agitated violently, and a crystal was made to generate. A generated crystal was filtered and washed and 29.8 g of enamine intermediates shown with the following structural formula (10) were obtained as a light yellow powder compound (83% of yield). As a result of analyzing an obtained enamine intermediate by liquid chromatography-mass spectrometry (liquid chromatography-mass spectrometry), it was 99.5% of purity, and $(M+H)^+ = 360.4$ (Calcd=359.17).

[0166]

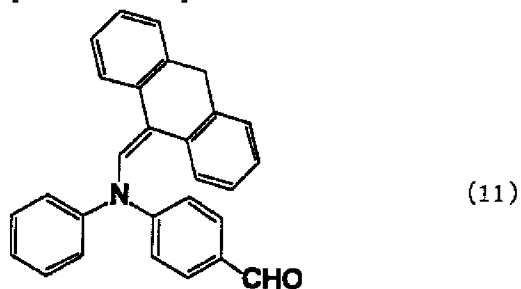
[Formula 13]



[0167]Next, 9.2 g (1.2 Eq) of phosphorus oxychloride was gradually added the bottom of ice-cooling, and into 100 ml of anhydrous N.N-dimethylformamide, it agitated for about 30 minutes, and the BIRUSU Meyer's reagent was prepared. Into this solution, 18.0 g (1.0 Eq) of enamine intermediates shown with said structural formula (10) obtained at said reaction were gradually added under ice-cooling. After addition, it heated gradually, reaction temperature was raised to 80 **, and heating churning was carried out at this temperature for 3 hours. After ending reaction, after cooling this reaction solution radiationally, it added gradually into 800 ml of iced 4N-sodium hydroxide solution, and the precipitate was produced. After the ** exception's having carried out formed precipitate and fully rinsing it, 18.4 g of enamine aldehyde intermediates shown with the following structural formula (11) were obtained as a yellow powder compound by performing recrystallization with ethanol / ethyl acetate solvent (95% of yield). As a result of analyzing the obtained enamine aldehyde intermediate by liquid chromatography-mass spectrometry, it was 99.6% of purity, and $(M+H)^+ = 388.3$ (Calcd=387.16).

[0168]

[Formula 14]



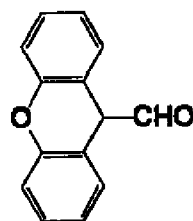
[0169]Next, 3.4 g (1.5 Eq) of potassium t-butoxide is dissolved in THF 15ml, This solution was cooled at 0 ** by the ice bath, and it agitated for about 10 minutes, adding gradually the

solution which melted 5.2 g (1.0 Eq) of p-methoxybenzyl diethyl phosphonate in THF20ml into that solution, and keeping at 0 **, and stable Wittig ylide was made to generate. The solution which melted 7.8 g (1.0 Eq) of enamine aldehyde intermediates shown in this solution with said structural formula (11) obtained at said reaction in THF30ml was added gradually. Then, an ice bath is removed and reaction temperature is raised to a room temperature, and it agitated for about 2 hours and was made to react. After extracting with the conventional method after ending reaction and distilling off a solvent, the enamine compounds 9.3g of illustration compound No.4 shown in Table 1 were obtained by performing recrystallization with ethanol / ethyl acetate solvent (95% of yield). As a result of analyzing the obtained enamine compounds by liquid chromatography-mass spectrometry, it was 99.1% of purity, and $(M+H)^+ = 492.4$ (Calcd=491.22).

[0170][The synthetic example 2] 30.2g (1.05 Eq) of alpha-naphthol and DL-10-camphor sulfonic acid 0.46g (0.01 Eq) were added to 24.6 g (1.0 Eq) of synthetic p-anisidines of illustration compound No.197, and heating churning was carried out at 160-170 ** for 24 hours. A reaction mixture was dropped at a lot of ethanol after ending reaction, generated sediments were collected, and 35.4 g of N-(p-methoxypheny)-1-naphthylamine was obtained by performing recrystallization by ethanol (71% of yield). Next, an aldehyde compound shown with 6.3g (1.0 Eq) of N-(p-methoxypheny)-1-naphthylamine and the following structural formula (12) which were obtained at said reaction is used as a starting material, The enamine compounds 10.6g of illustration compound No.197 shown in Table 29 were obtained as a light yellow powder compound by performing enamine-izing, aldehyde-izing, and styryl-ization like the above-mentioned synthetic example 1 (73% of three-stage yield). As a result of analyzing obtained enamine compounds by liquid chromatography-mass spectrometry, it was 99.0% of purity, and $(M+H)^+ = 574.4$ (Calcd=573.23).

[0171]

[Formula 15]



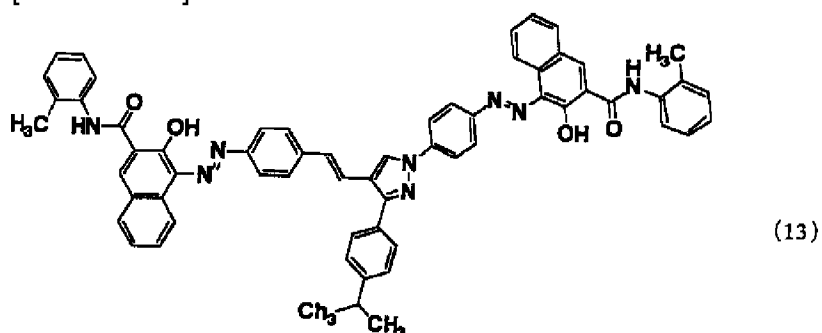
(12)

[0172][Example 1] After adding azo compound 1 weight section shown with the following structural formula (13) to a resin solution in which THF99 weight section was made to dissolve phenoxy resin (Union Carbide PKHH) 1 weight section, a paint shaker was made to distribute for 2 hours, and coating liquid for charge generating layers was prepared. On polyester film (80 micrometers of thickness) of the vacuum plating of aluminium, this coating liquid for charge

generating layers was applied so that thickness after desiccation might be set to 0.3 micrometer by a baker applicator, and a charge generating layer was formed.

[0173]

[Formula 16]



(13)

[0174]Next, enamine-compounds 8 weight section of illustration compound No.4 shown in Table 1 and polycarbonate resin (made in [C-1400] Teijin Chemicals) 10 weight section were dissolved in THF80 weight section, and the coating liquid for charge transport layers was prepared. On the charge generating layer which formed previously this coating liquid for charge transport layers, it applied so that the thickness after desiccation might be set to 10 micrometers by a baker applicator, and the charge transport layer was formed.

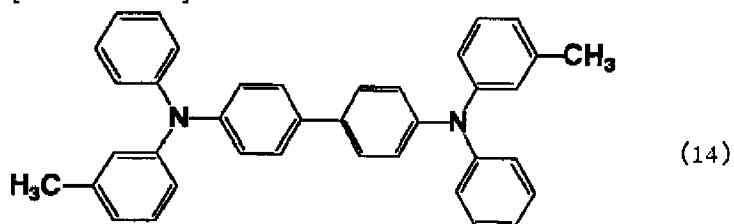
[0175]Thus, an electro photography photo conductor of a lamination type which has the lamination shown in drawing 1 was produced.

[0176][Examples 2-6] It replaced with illustration compound No.4 and five kinds of electro photography photo conductors were produced like Example 1 except having used enamine compounds of illustration compound No.74,151,197,230 and 329 shown in Tables 1-59.

[0177][Comparative example 1] It replaced with illustration compound No.4 and an electro photography photo conductor was produced like Example 1 except having used comparison compound A shown with the following structural formula (14).

[0178]

[Formula 17]



(14)

[0179][Evaluation 1] About the electro photography photo conductor produced by the above Examples 1-6 and comparative example 1, ionization potential was measured using the surface analysis device (AC-1 by Riken Keiki Co., Ltd.). After vapor-depositing gold to the upper surface of these electro photography photo conductors, mobility was measured by the

Time-of-Flight method under a room temperature and decompression. These evaluation results are shown in Table 60. About mobility, a value in case field intensity is $2.5 \times 10^5 \text{ V/cm}$ is shown.

[0180]

[Table 60]

	電荷輸送物質	イオン化ポテンシャル (eV)	移動度 ($\text{cm}^2/\text{V} \cdot \text{sec}$)
実施例 1	例示化合物 4	5.50	4.2×10^{-4}
実施例 2	例示化合物 74	5.63	3.2×10^{-5}
実施例 3	例示化合物 151	5.45	1.0×10^{-3}
実施例 4	例示化合物 197	5.65	4.7×10^{-5}
実施例 5	例示化合物 230	5.50	5.8×10^{-4}
実施例 6	例示化合物 329	5.10	7.7×10^{-4}
比較例 1	比較化合物 A	5.40	1.2×10^{-6}

[0181]A result of Table 60 showed having high mobility one to 3 *****, though enamine compounds of an example were comparable ionization potential as compared with TPD(s) (Triphenylaminodimer), such as comparison compound A used widely now.

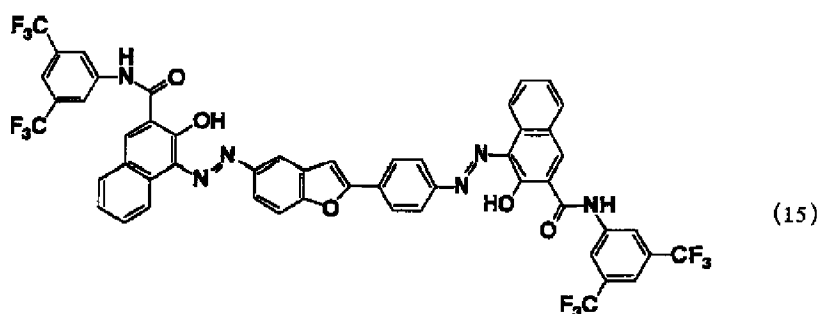
[0182][Example 7] Titanium oxide (TTO-D-1 by Ishihara Sangyo Kaisha, Ltd.) 9 arborescence-shaped weight section which performed a surface treatment by aluminum₂O₃ and ZrO₂,

Copolyamide resin (CM8000 by Toray Industries, Inc.) 9 weight section was added to a partially aromatic solvent of 1,3-dioxolane 41 weight section and methyl alcohol 41 weight section, and was distributed for 12 hours using a paint shaker, and intermediate layer coating liquid was prepared. On an aluminum substrate, prepared intermediate layer coating liquid was applied so that thickness after desiccation might be set to 1 micrometer by a baker applicator, and an interlayer was formed.

[0183]Subsequently, after adding the amount part of azo compound duplexes shown with the following structural formula (15) to the resin solution in which THF97 weight section was made to dissolve butyral resin (BX-1 by Sekisui Chemical Co., Ltd.) 1 weight section, the paint shaker was made to distribute for 10 hours, and the coating liquid for charge generating layers was prepared. On the interlayer who formed previously this coating liquid for charge generating layers, it applied so that the thickness after desiccation might be set to 0.3 micrometer by a baker applicator, and the charge generating layer was formed.

[0184]

[Formula 18]



[0185] Subsequently, enamine-compounds 10 weight section of illustration compound No.4 shown in Table 1, polycarbonate resin (Mitsubishi Gas Chemical Co., Inc. make Z200) 14 weight section, and 2,6-di-tert-butyl-4-methylphenol 0.2 weight section were dissolved in THF80 weight section, and the coating liquid for charge transport layers was prepared. On the charge generating layer which formed previously this coating liquid for charge transport layers, it applied so that the thickness after desiccation might be set to 18 micrometers by a baker applicator, and the charge transport layer was formed.

[0186] Thus, an electro photography photo conductor of a lamination type which has the lamination shown in drawing 2 was produced.

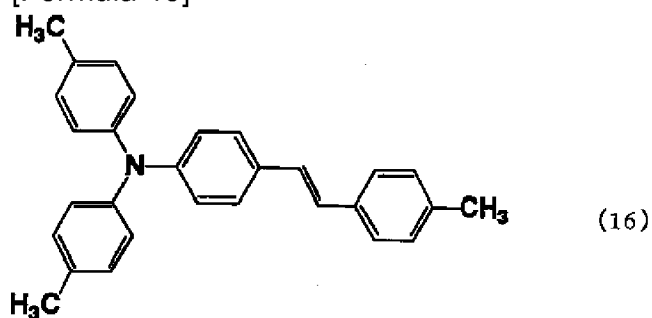
[0187][Examples 8-12] It replaced with illustration compound No.4 and five kinds of electro photography photo conductors were produced like Example 7 except having used enamine compounds of illustration compound No.74,151,197,230 and 329 shown in Tables 1-59.

[0188][Comparative example 2] It replaced with illustration compound No.4 and an electro photography photo conductor was produced like Example 7 except having used comparison compound A shown with said structural formula (14).

[0189][Comparative example 3] It replaced with illustration compound No.4 and an electro photography photo conductor was produced like Example 7 except having used the comparison compound B shown with the following structural formula (16).

[0190]

[Formula 19]



[0191][Example 13] Intermediate layer coating liquid was prepared like Example 7, it applied so that the thickness after drying this on an aluminum substrate might be set to 1 micrometer, and the interlayer was formed.

[0192]Next, azo compound 1 weight section, polycarbonate resin (Mitsubishi Gas Chemical Co., Inc. make Z-400) 12 weight section which are shown with said structural formula (15), A ball mill distributed ten weight section [of illustration compound No.4], 3,5-dimethyl- 3', and 5'-di-t-butyl diphenoquinone 5 weight section, 2,6-di-tert-butyl-4-methylphenol 0.5 weight section, and THF65 weight section for 12 hours, and coating liquid for photosensitive layers was prepared. After applying prepared coating liquid for photosensitive layers by a baker applicator on an interlayer who formed previously, hot air drying was carried out at 110 ** for 1 hour, and a photosensitive layer was formed by 20 micrometers of dry membrane thickness.

[0193]Thus, an electro photography photo conductor of a monolayer type which has the lamination shown in drawing 3 was produced.

[0194][Example 14] It replaced with an azo compound shown with said structural formula (15) as charge generating material, and an electro photography photo conductor was produced like Example 7 except having used X type non-metal phthalocyanines.

[0195][Examples 15-19] It replaces with an azo compound shown with said structural formula (15) as charge generating material, Using X type non-metal phthalocyanines, it replaced with illustration compound No.4 as charge transport material, and five kinds of electro photography photo conductors were produced like Example 7 except having used enamine compounds of illustration compound No.74,151,197,230 and 329 shown in Tables 1-59.

[0196][Comparative examples 4 and 5] It replaces with an azo compound shown with said structural formula (15) as charge generating material, Using X type non-metal phthalocyanines, it replaced with illustration compound No.4 as charge transport material, and two kinds of electro photography photo conductors were produced like Example 7 except having used the comparison compound B shown with comparison compound A shown with said structural formula (14), and said structural formula (16).

[0197][Evaluation 2] An electro photography photo conductor produced by the above Examples 7-19 and comparative examples 2-5 was evaluated using electrostatography paper test equipment (EPA-8200 by the Kawaguchi electrical machinery company). Measurement was performed in each under the ordinary temperature / normal-relative-humidity environment of 22 **/65%RH, and the low temperature / damp environment of 5 **/20%RH (under N/N environment) (under L/L environment). Electrification potential (V_0 [V]) when -5kV is impressed to sensitivity ($E_{1/2}$ [$\mu\text{J}/\text{cm}^2$]) and a photo conductor which are the light exposure taken to reduce potential by half by exposure as evaluation of an initial characteristic, and rest potential (V_r [V]) 10 seconds after exposure were measured. In the case of a photo conductor which used an azo compound of said structural formula (15), in the case of a photo conductor using X type non-metal phthalocyanines, light of wavelength of 780 nm which carried out the spectrum in a monochromator, and 1 microwatt/ cm^2 was used for exposure using white light

of 1 microwatt/cm² as charge generating material. Sensitivity ($E_{1/2}$) after repeating electrification, exposure, and electric discharge 5000 times, electrification potential (V_0), and rest potential (V_r) were measured as evaluation of the repetition characteristic. These evaluation results are shown in Table 61.

[0198]

[Table 61]

	電荷発生物質	電荷輸送物質	N/N: 22°C/65%RH						L/L: 5°C/20%RH					
			初期特性			繰返し特性			初期特性			繰返し特性		
			$E_{1/2}(\mu J/cm^2)$	$V_0(V)$	$V_r(V)$	$E_{1/2}(\mu J/cm^2)$	$V_0(V)$	$V_r(V)$	$E_{1/2}(\mu J/cm^2)$	$V_0(V)$	$V_r(V)$	$E_{1/2}(\mu J/cm^2)$	$V_0(V)$	$V_r(V)$
実施例7	アゾ化合物 (15)	例示化合物 4	0.14	-584	-10	0.15	-575	-14	0.14	-585	-14	0.15	-575	-18
実施例8	アゾ化合物 (15)	例示化合物 74	0.19	-582	-15	0.20	-573	-20	0.21	-586	-29	0.22	-574	-35
実施例9	アゾ化合物 (15)	例示化合物 151	0.11	-579	-8	0.12	-578	-10	0.11	-581	-10	0.11	-571	-15
実施例10	アゾ化合物 (15)	例示化合物 197	0.18	-580	-14	0.18	-574	-16	0.19	-586	-25	0.20	-589	-31
実施例11	アゾ化合物 (15)	例示化合物 230	0.13	-584	-10	0.13	-570	-12	0.13	-587	-15	0.13	-572	-19
実施例12	アゾ化合物 (15)	例示化合物 329	0.14	-582	-8	0.15	-589	-12	0.14	-579	-12	0.15	-575	-17
比較例2	アゾ化合物 (15)	比較化合物 A	0.20	-578	-35	0.22	-578	-36	0.42	-579	-50	0.45	-571	-51
比較例3	アゾ化合物 (15)	比較化合物 B	0.21	-591	-40	0.25	-589	-54	0.45	-581	-55	0.51	-579	-65
実施例13	アゾ化合物 (15)	例示化合物 4	0.22	552	19	0.25	545	22	0.23	554	22	0.25	542	26
実施例14	X型金属フタロシアニン	例示化合物 4	0.09	-581	-7	0.10	-575	-10	0.09	-581	-10	0.10	-575	-15
実施例15	X型金属フタロシアニン	例示化合物 74	0.11	-580	-12	0.12	-572	-15	0.13	-582	-18	0.15	-571	-25
実施例16	X型金属フタロシアニン	例示化合物 151	0.08	-585	-5	0.07	-570	-8	0.08	-579	-9	0.08	-572	-12
実施例17	X型金属フタロシアニン	例示化合物 197	0.12	-579	-14	0.12	-569	-19	0.15	-583	-19	0.16	-572	-25
実施例18	X型金属フタロシアニン	例示化合物 230	0.10	-584	-5	0.11	-576	-9	0.10	-581	-12	0.12	-570	-15
実施例19	X型金属フタロシアニン	例示化合物 329	0.10	-583	-5	0.12	-577	-10	0.11	-579	-10	0.11	-569	-13
比較例4	X型金属フタロシアニン	比較化合物 A	0.15	-586	-25	0.17	-576	-27	0.38	-580	-45	0.38	-578	-46
比較例5	X型金属フタロシアニン	比較化合物 B	0.16	-581	-30	0.19	-575	-40	0.38	-579	-50	0.45	-570	-59

[0199][Example 20] Titanium oxide (TTO-D-1 by Ishihara Sangyo Kaisha, Ltd.) 9 arborescence-shaped weight section which performed a surface treatment by aluminum₂O₃ and ZrO₂, As binder resin, after adding copolyamide resin (CM8000 by Toray Industries, Inc.) 9 weight section to a mixed solvent of 1,3-dioxolane 41 weight section and methyl alcohol 41 weight section, a paint shaker was made to distribute for 8 hours, and intermediate layer coating liquid was prepared. Prepared intermediate layer coating liquid was filled to a coating tub, the 40 mm[in diameter] x[in overall length / 340 mm] cylindrical substrate made from aluminum was immersed as a conductive substrate, and intermediate layer coating liquid was applied to the surface of this conductive substrate. By this dip coating method, an interlayer of 1.0 micrometer of thickness was formed on a conductive substrate.

[0200]Subsequently, in a diffraction spectrum by CuKalpha characteristic X ray, as charge generating material by a bragg angle (2theta**0.2 degree). The amount part of oxo titanylphthalocyanine pigment duplexs which has a clear diffraction peak at at least 27.3 degrees, Polyvinyl-butyr-al-resin (S lek BM-S by Sekisui Chemical Co., Ltd.) 1 weight section and methyl-ethyl-ketone 97 weight section were mixed, distributed processing was carried out with a paint shaker, and coating liquid for charge generating layers was prepared. Prepared coating liquid for electric charge generating was applied by the same method as the above-mentioned interlayer, and it formed on an interlayer who formed previously a charge generating layer of 0.4 micrometer of thickness.

[0201] Subsequently, enamine-compounds 10 weight section of illustration compound No.57 shown in Table 9, Polycarbonate resin (you pyrone Z200 by Mitsubishi engineering-plastics company) 20 weight section, 2,6-di-tert-butyl-4-methylphenol 1 weight section and dimethylpolysiloxane (KF-96 by Shin-Etsu Chemical Co., Ltd.) 1 weight section were dissolved in THF, and the coating liquid for charge transport layers of 23 % of the weight of solid content was prepared. After applying the prepared coating liquid for charge transport layers on the charge generating layer previously formed by the dip coating method, it dried at 110 °C for 1 hour, the charge transport layer of 23 micrometers of dry membrane thickness was formed, and the electro photography photo conductor was produced.

[0202][Examples 21 and 22] It replaced with illustration compound No.57 and two kinds of electro photography photo conductors were produced like Example 20 except having used the enamine compounds of illustration compound No.154 and 272 shown in Tables 1-59.

[0203][Comparative example 6] It replaced with illustration compound No.57 and the electro photography photo conductor was produced like Example 20 except having used the comparison compound A shown with said structural formula (14).

[0204][Example 23] The electro photography photo conductor was produced like Example 20 except having made polycarbonate resin of the coating liquid for charge transport layers into 25 weight sections.

[0205][Examples 24 and 25] Polycarbonate resin of the coating liquid for charge transport layers was made into 25 weight sections, it replaced with illustration compound No.57, and two kinds of electro photography photo conductors were produced like Example 20 except having used the enamine compounds of illustration compound No.154 and 272 shown in Tables 1-59.

[0206][Evaluation 3] Carry the electro photography photo conductor produced by the above Examples 20-25 and comparative example 6 in the digital copier (AR-C150 by a sharp company) set to sec in 117 mm /, and process speed as durability test, Early thickness and the thickness after the end of on-the-spot photo Aging of 40,000 sheets were measured, and it asked for amount of film decreases Δt which is the difference. Electrification potential [as a stability test of an electrical property] V_0 under the N/N environment of 22 °C/65%RH and surface potential V_L after laser exposure, And surface potential when carried out under the L/L environment of 5 °C/20%RH was measured, and potential fluctuation ΔV_L which is a difference of this and surface potential V_L under N/N environment was calculated. The minus sign shown in the column of ΔV_L expresses the fall of the absolute value of potential.

These evaluation results are shown in Table 62.

[0207]

[Table 62]

	電荷輸送物質	電荷輸送物質/ バインダー樹脂	膜減り量 Δd (μm)	N/N・電位特性		L/L・電位変動
				$V_0(\text{V})$	$V_L(\text{V})$	$\Delta V_L(\text{V})$
実施例 2 0	例示化合物 57	10/20	4.5	-521	-42	-21
実施例 2 1	例示化合物 154	10/20	4.4	-519	-32	-15
実施例 2 2	例示化合物 272	10/20	4.5	-520	-36	-18
比較例 6	比較化合物A	10/20	4.3	-518	-102	-70
実施例 2 3	例示化合物 57	10/25	3.3	-522	-48	-28
実施例 2 4	例示化合物 154	10/25	3.4	-523	-37	-20
実施例 2 5	例示化合物 272	10/25	3.4	-525	-43	-25

[0208] Since the enamine compounds of an example had high mobility compared with a comparative example, as for the electro photography photo conductor of an example, the result of Tables 61 and 62 showed that it was high sensitivity. Under L/L environment, various electrical properties were good, and it turned out that the ratio of binder resin to the enamine compounds which are charge transport material is made high, and it has a good electrical property under the situation where content of binder resin in a charge transport layer was made high.

[0209] The above result showed that high sensitivity and the electro photography photo conductor which has high durability could be provided, when using the enamine compounds of this invention.

[0210]

[Effect of the Invention] According to this invention, the enamine compounds which are the photoconductivity material of the high organic system of charge mobility can be obtained by low cost by having a specific structure compared with the photoconductivity material of an inorganic system as mentioned above.

[0211] By making it contain in a photosensitive layer by using as charge transport material the enamine compounds which have said specific structure according to this invention, It excels in endurance by high sensitivity, and also when it uses by the bottom of low temperature environment, and a high speed process, the electro photography photo conductor and image forming device with which the electrical property does not fall can be obtained.

[Translation done.]